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BY

WALDO L. SCHMITT

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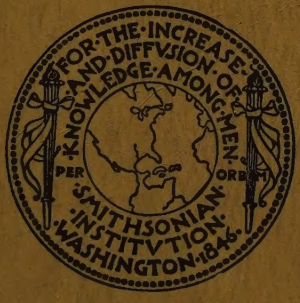

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THE SPECIES OF AEGLA, ENDEMIC SOUTH AMERICAN FRESH-WATER CRUSTACEANS[1]

By Waldo L. Schmitt

Widely distributed throughout the greater part of temperate South America from about latitude 20°30′ S. (Franca, São Paulo, Brazil) to latitude 40° 28′ S. (Abtao, Llanquihue, Chile) is the unique, endemic genus of fresh-water decapod Crustacea known as *Aegla* (family Aeglidae). Its nearest relatives are marine and probably to be found somewhere among the galatheids (tribe Galatheidea). There are no fresh-water Crustacea at all like *Aegla* anywhere else in the world.

Most authorities have believed the genus monotypic—genotype, *A. laevis* (Latreille), 1818 (pl. 308, fig. 2). In so doing they certainly must have considered differences that are at times rather marked between specimens from widely separated places, or in some instances from the same locality, as variations of no great importance, or else were possessed of altogether too little material to be able to evaluate it properly. Carlos Moreira (1901), at the time a member of the zoological staff of the Museu Nacional, Rio de Janeiro, Brazil, was the first to dissent, insisting and, indeed, demonstrating that at least the species described by Fritz Müller (1876) as *A. odebrechtii* was distinct from *A. laevis*. For his Brazilian specimens, regrettably, Moreira employed the name *Aegla intermedia*, which had been given a

[1] This paper was first presented as an illustrated address, entitled "Some Remarks on the Endemic South American Freshwater Crustacean *Aegla laevis* (Latreille)," before Section II, Biological Sciences, of the Eighth American Scientific Congress, Washington, May 16, 1940. An abstract of this address appears in the Proceedings of that Congress, vol. 3, p. 491, 1942.

Chilean species by Girard (1855, p. 255) and which species, by the way, seems never to have been taken again.

On my first visit to South America, in the fall of 1926, under the auspices of the Walter Rathbone Bacon Scholarship of the Smithsonian Institution, I planned to obtain additional specimens of *A. odebrechtii*. I thought I was successful at Castro, Paraná, Brazil, but the specimens I got there, however much they may superficially resemble *A. odebrechtii*, are another species (*castro*), named in this paper.

En route to Castro, I stopped in Rio Negro. Here, with the help of Carlos Zornig, at whose hotel I stayed, and with baited wicker fish traps that he provided, I caught several large Aeglas. One of these is the largest representative of the genus ever to be taken, measuring approximately 44 mm. in length of carapace and rostrum together. It is the type of the species *parana*, which I am naming for the State in which it was found.

Although I was chiefly interested in procuring marine decapods at the time, I did not neglect looking for Aeglas as opportunities arose. In that verdant park, the Prado, at Montevideo, Uruguay, Juan Tremoleras and I collected a lot of small Aeglas from one of the smaller watercourses. These, too, proved new, and are named *prado* in commemoration of the place and occasion of their capture.

When Dr. Martin Doello-Jurado, director of the Museu Argentino de Ciencias Naturales, learned of my interest in *Aegla*, he most generously took me on an all-day excursion to the delightful resort of Tigre. Here numbers of smaller specimens of a hitherto unrecognized species were found. This species (*uruguayana*), however, I have described from a larger, more fully developed specimen from San Carlos, Uruguay, belonging to the Field Museum of Natural History in Chicago. Dr. Doello-Jurado also kindly granted a loan of his museum's collection of these crustaceans. Without this great help, this paper could scarcely have been written, for in that fine collection, along with representatives of several other species, are the holotypes of four of the new species herein described: *sanlorenzo*, *jujuyana*, *affinis*, and *humahuaca*.

At Concepcion, Chile, January 1927, the director of the Concepcion Museum, Dr. Carlos Oliver Schneider, Carl Junge, and I made a very successful haul of Aeglas on the outskirts of town. These formed the basis of *A. concepcionensis*.

In the course of an examination of the crustacean collections of the Field Museum, two new species of *Aegla* were located, one (*papudo*) from Papudo, Chile, and one (*uruguayana*) from San Carlos, Uruguay, a species already referred to above.

The Museum of Comparative Zoology, Cambridge, Mass., through the kindness of Dr. Fenner A. Chace, Jr., also lent me all their Aeglas for study. One specimen of a lot from Santiago, Chile, was selected as the neotype of *A. laevis*. There is no certainty that the original type is extant or in the Paris Museum, where it was believed to have been deposited. Another specimen, from Talcahuano, Chile, has been made the type of a new subspecies of *A. laevis* bearing the subspecific name *talcahuano*.

From the late Dr. Carl H. Eigenmann, of the University of Indiana, the National Museum received certain Chilean Crustacea, which included a new species, *A. abtao*, and several specimens of the long-lost *A. denticulata* of Nicolet.

In the type collections of the United States National Museum, in addition to *A. castro*, *parana*, *prado*, *odebrechtii* (neotype), *concepcionensis*, and *abtao*, there are the types of five other new forms: *A. platensis*, *franca*, *odebrechtii paulensis*, *neuquensis*, and *riolimayana*.

The late Dr. Florentino Felippone, of Montevideo, contributed specimens of *Aegla* from Uruguay to the United States National Museum collections on several occasions, as did also Alberto Tremoleras, of the same city. Finally, I received additional very helpful material from Dr. Carlos E. Porter, of Santiago, collected in part by Dr. A. Santa Cruz, of Concepcion, Chile; from Dr. Carlos Moreira, of Rio de Janeiro, collected by Dr. G. Kuhlmann at Blumenau, Santa Catharina, Brazil; and from Dr. Paulo Sawaya, of the University of São Paulo.

Through the kindness of Henry W. Fowler, of the Academy of Natural Sciences of Philadelphia, and G. Ayres Coventry, research associate in charge of Crustacea, I had the opportunity of examining seven Aeglas (four lots) contained in the Academy's collections: (1) Three females collected by "Dr. Wilson" in Chile, which proved to be *A. papudo;* (2) two females of *A. laevis* received years ago from the Smithsonian Institution, for which regrettably there are no locality data or any record at the Institution of this particular sending; (3) a dried specimen of what is unmistakably *A. odebrechtii*, "du Brésil. Donni par M. M. Derreaux"; and (4) one of Dana's Wilkes Exploring Expedition Aeglas with an original printed Expedition label filled out presumably by Dana himself—"*Aeglea laevis*. Chili."

I am immeasurably indebted to the Walter Rathbone Bacon Scholarship of the Smithsonian Institution, which enabled me to visit South America personally to collect some of the specimens upon which this paper is based and to establish the many helpful contacts that made it possible to gather the most comprehensive representation of the genus *Aegla* that has ever been in anyone's hands for study at

one time. I am also deeply grateful to the many good friends and scientific institutions who helped me with specimens, pertinent information, facilities of various kinds, and assistance in the field and otherwise. Most, if not all, of these are mentioned either in the foregoing recapitulation or in the following text.

The manuscript was helpfully criticized and typed by my secretary, Miss Lucile McCain. The drawings are the work of Mrs. Aime Awl, staff artist to the department of biology of the United States National Museum. The photographs and prints were made by Gurney I. Hightower and F. B. Kestner, of the Museum's photographic staff. I am also indebted to Dr. Olga Hartman, of the Allan Hancock Foundation, and Dr. Walter Weymouth, of Stanford University, for some very helpful suggestions.

HISTORICAL REVIEW

In 1818 (pl. 308, fig. 2) Latreille figured, without description, a new crustacean to which he gave the name *Galathea laevis*, perhaps unaware that his species was from fresh water and that the genus in which he placed it was exclusively marine. Not more than two years later Leach (1820 [1821], p. 49) quite correctly observed that Latreille's species represented not only a new species, but a new genus as well. This he named *Aegla*.

According to Dr. R. A. Philippi (1894, p. 372 [p. 4 of sep.]), and the late Edwyn C. Reed in a letter to Dr. Mary J. Rathbun dated June 6, 1895, a crustacean of this type was recognized (but not described) as early as 1782 (pp. 206, 347; 1789, p. 182) by Molina in his "Saggio sulla Storia Naturale del Chile" as *Cancer apancora*.

So far as I am aware, it was Desmarest (1825, p. 187, pl. 33, fig. 2) who, without contributing any additional information, introduced the incorrect spelling of the generic name, *Aeglea*, which all subsequent authors, except Dr. Mary J. Rathbun (1910, p. 602), seem to have followed, even Latreille (1829, p. 84) himself. Miss Rathbun, however, called attention to the fact that Leach spelled the name *Aegla*, not *Aeglea*.

The figure of *Aegla laevis* that Desmarest published along with his brief description is very similar to Latreille's, yet in some respects it is different enough in the shape of the chelae and in the addition of orbital spines to have been taken from some other specimen. If based on the same specimen, Desmarest's is the better figure. Both Leach and Desmarest state that the material upon which their remarks were based was to be found in the collections of the Paris Museum. Neither made mention of a locality. There is now no specimen in that museum that can be definitely linked with either of these authors, or with Latreille, for that matter, unless, as I am informed by Dr. Louis Fage, of the Laboratoire de Zoologie (Vers

et Crustacés), Muséu National d'Histoire Naturelle, Paris, it might be a very old, dried specimen carrying the name *A. laevis* without other data.

Griffith (1833, p. 184, pl. 7, fig. 2), who, in his "Animal Kingdom of Cuvier," supplied a colored illustration of *A. laevis*, which appears to be a crudely done, reversed reproduction of Desmarest's figure, adds nothing in the way of a locality or specific characters to the still scanty knowledge of this crustacean.

In his classic "Histoire Naturelle des Crustacés," H. Milne-Edwards (1837, p. 258) gave a rather extensive discussion of the genus, and a concise description of the species, which, however, is of no more than generic value today. Also, he is the first to give the species a home: "Habite les côtes du Chili."

The "Disciples Edition" of Cuvier's "Le Règne Animal" (1837,[2] p. 124, pl. 47, fig. 3) has an *Aegla* in color, together with some details in black and white, that is quite different from the figures that antedated it. The Paris Museum may have come into possession of better material of what was taken to be *A. laevis*, but it is difficult to believe that this particular drawing could have been based on the original type, for, in spite of its more natural appearance the lateral margin of the anterior portion of the carapace is most certainly not accurate, no matter what the species represented may actually be.

The "aeglée lisse" of these several authors next appears as "*Aeglea laevigata*" in H. Milne-Edwards and Lucas' account (1843 [1844], p. 34) of the Crustacea of d'Orbigny's "Voyage dans l'Amérique Méridionale," surely an unintentional mistranslation of the French common name of what was known in the scientific literature of the day as *A. laevis*.

It may be that all the foregoing records were based on the same species, but it was given to Nicolet (1849, p. 200; Atlas, pl. 2, fig. 1) to add a second and unmistakably new species to the genus, *A. denticulata*, in Gay's monumental "Historia Fisica y Politica de Chile." His well-characterized and distinctively figured species is readily identifiable. On the other hand, his description of *A. laevis*, which he unfortunately did not figure, leaves much to be desired. It cannot be distinguished from any of the species, except *A. denticulata*, now known to inhabit Chile. Nicolet's *A. denticulata* was so at variance with what most authors, myself included, thought a species of *Aegla* could possibly look like, that it always was believed to have been

[2] In a little note seeking to establish the date of issue of the crustacean plates of Cuvier's "Le Règne Animal" (Disciples Edition) I stated (1937, p. 151) that no reference to this particular edition was to be found in the second volume of Milne-Edwards' "Histoire Naturelle des Crustacés" (1837). In the course of reviewing the history of *Aegla laevis*, I find that I was mistaken and that a number of the Disciples Edition plates are cited in that volume. This oversight in no way invalidates my contention that the date of the crustacean plates in the Disciples Edition should be 1837.

incorrectly figured and described. The most surprising thing about it, however, is that a so strikingly different *Aegla* eluded rediscovery for so long a time. Specimens taken by the late Dr. C. H. Eigenmann at Osorno, Chile, in 1919 have at last enabled me to establish the validity of Nicolet's species 93 years after its original description.

In April 1839, the United States Exploring Expedition secured a number of Aeglas "in shallow fresh water streams, [in] Chili, from beyond the Cuesto del Prado, on the road from Valparaiso to Santiago, sixty miles from the sea; abundant, swimming generally over the bottom." Dana (1852, p. 476; Atlas, 1855, pl. 30, fig. 6*a-f*) determined, redescribed, and figured these specimens as *A. laevis*, yet they cannot safely be assigned to any of the known species of the genus, as the fingers of the chelae as figured are without a lobular tooth on their prehensile margins; the general appearance of the palmar crest and the lack of a definite or spiny lobe on the outer margin of the movable finger near the base suggest *A. laevis talcahuano*.

[After the foregoing paragraph had been type-set I had the opportunity of examining one of Dana's original specimens as noted above (p. 433). It is identical with what I have redescribed as true *A. laevis*. Except for its somewhat smaller size, 9 mm. less in length of carapace and rostrum taken together, it might have been the specimen figured by Dana. His drawing seems to have been a little hastily done, for the rostrum is too slender and sharp, and the hands are not very well drawn. This particular specimen distinctly shows a well-formed lobular tooth on the prehensile margin of the fixed finger of each hand and a definite, though small, spined lobe near the base of the outer margin of each movable finger.]

A third species, *A. intermedia*, was proposed by Girard (1855, p. 255) in his report on the Crustacea of the United States Naval Astronomical Expedition. A discussion of the genus preceded a listing of the two previously described species, *A. laevis* and *A. denticulata*, and his description of the new one. This description does not supply enough detailed information to permit the keying out of his from the other species of *Aegla*. I have therefore not dealt with Girard's species beyond this brief mention and on page 431 and page 448, footnote. Some day it may be found again at the type locality, "the upper affluents of the Rio de Maypu, 2,000 feet above the level of the sea, near Santiago [Chile]," and perhaps be recognized by the second row of spines on the carpus of the cheliped. Such a second row of spines occurs in *A. denticulata* but not in any of the other known Chilean species, but the marginal toothing of the posterior portion of the carapace at once sets the two apart. If Girard's *A. intermedia* had possessed such toothing, surely he could not have failed to see or mention it.

Heller's report (1868, p. 81) on the *Novara* Crustacea has *A. laevis* as being represented in the material collected in "Chili." Up to and including Heller's report, *Aegla* had been recorded only from Chile.

The very first records from any other part of South America are those of von Martens (1868, p. 26; 1869, p. 14). He had specimens from Rio Grande do Sul, Brazil, Rödersberg, and Porto Alegre, some of which had been collected as early as 1831. Unless specimens are extant and in good condition, it will be impossible to determine just what von Martens, or, indeed, almost every other author cited in this paper, took to be *A. laevis*.

The next record from Brazil is that of Fritz Müller (1876, p. 13). He described a unique species from the Serra do Mar, between the headwaters of the Itajahy and the Rio das Marombas, in the State of Santa Catharina, under the name of *A. odebrechtii*. His species, like *A. denticulata*, by virtue of its illustration and excellent description, was easily recognizable on rediscovery (see Moreira, 1901; p. 439 of this résumé; also p. 431 above).

This same year Lucas (1876, p. cx) announced the discovery of *A. "laevis"* in Argentina from the Rio de la Plata. He said that on the tidal flats of the estuary, which are exposed at low tide, and where the water is quite fresh because of the great distance from the sea, this crustacean is found in prodigious numbers under slightly embedded rocks, shingle, pebbles, remains of shells, and detritus of all kinds, and that it is much sought after for food by the inhabitants, with whom, in this part of South America, it occupies the place held by the crayfish in Europe. Some time later (1891, p. lxxxix), Lucas received specimens from the Rio Mendoza in the Argentine Cordillera at an elevation of from 1,800 to 2,000 meters.

Scarcely six months thereafter Wierzejski (1892, p. 15 [1893, p. 232, 243]) obtained *A. "laevis"* from the environs of the city of Mendoza, in the province of the same name. Wierzejski's paper, perhaps because it was published in Polish, escaped notice until he (1897, p. 1) furnished a German translation of the portion dealing with *Aegla*, in order to correct Nobili's impression (1896) (below, p. 438) of being the first to report *Aegla* from the Argentine. Wierzejski's remarks, in part, are here translated again, this time somewhat freely into English: "Associated with [the fresh-water amphipod] *Hyalella inermis* in one of the streams discharging from one of the larger lagunas in the vicinity of [the city of] Mendoza. In life apparently dark blue; alcoholic specimens are dorsally bluish gray, ventrally reddish. So far as I can ascertain from the description of Professor Martens, there are no appreciable differences between the Argentine form and those from Chile and Brazil which were described by Milne-Edwards and Dana. The largest specimens measure 7 cm. in length and 1.7 cm. in width; the natives gather this

crustacean for culinary purposes. Hitherto, it was known only from the streams in virgin forests in Chile and Brazil. Martens regarded it as an endemic South American species."

In 1892 (p. ccvi) Berg corroborated Lucas' (1876; 1891) observations on the occurrence of *Aegla*, and its range from the elevated regions of the country to the lowlands, from the Cordillera of Mendoza to the River Plate in the vicinity of Buenos Aires, but there at a distance from the sea. He reported its presence in Uruguay, where he said that it is more abundant and is found [at times] close to the sea coast, as in the rivulets Miguelete and Carrasco, and also in some localities where the fresh water becomes brackish at sea level, and that it had also been found at Minas, about 159 kilometers from Montevideo, in a spring that had been uncovered on a small mountain in the course of excavating limestone. Berg, who appears not to have seen these particular specimens, credited the find to Prof. Arechavaleta, the chemist who examined the water with a view to its utilization by the city. He regretted that the latter failed to state whether the organs of sight were developed in these animals or not. Berg also took occasion to say, on comparison of specimens from southern Brazil, Chile, Mendoza, Buenos Aires, and Montevideo, that it was his belief that Fritz Müller's *A. odebrechtii* is the same as *A. laevis*.

This same year, Ortmann (1892, p. 246) summarized the distribution of *A. "laevis"* and added a new south Brazilian locality record, São Lourenço, and figured the mouth parts.

Not aware that he had been antedated, Nobili (1896, p. 1) thought he had seen the first Aeglas from the Argentine, from San Lorenzo (Jujuy), Tala (Tucuman), and the Province of San Luis. He observed that the coloration of the Tala specimens differed from that of the San Lorenzo and San Luis ones. To some degree, at least, I believe color of specific significance in this genus. Nobili also called attention to S. I. Smith's (1869, p. 31) "List of the Described Species of Brazilian Podop[h]thalma," saying that *A. laevis* had been omitted. Smith (1869, p. 39) made reference to a *Galathea amplectens* of Fabricius (1798, p. 415) but believed that "it is probably not a true *Galathea*." This species in some respects suggests *Aegla*. According to Fabricius, the carapace of *G. amplectens* is smooth and the rostrum short and emarginate [forming the orbits]; but, contrariwise, Fabricius distinctly stated that this species inhabits the ocean off Brazil and that it is luminous at night. The latter phenomenon might have been due to bacterial infection and the reference to a marine habitat in error. However, as this crustacean seems to have come under the scrutiny of Latreille (1803, p. 199), the author of *A. laevis*, as well as that of H. Milne-Edwards (1837, p. 276), and yet was not identified by either of them with

Aegla, it must be distinct, even if not a true *Galathea* as Smith suspected.

Apprised by Wierzejski (1897, p. 1) of the shortcomings of his earlier note, Nobili (1898, p. 6) hastened to publish an emendation. In this he pointed out that Wierzejski (1892) himself had been anticipated by Lucas (1876), and that Berg's note (1892) appeared the same year as Wierzejski's.

Almost on the heels of this note of Nobili's (1898), not quite three months later, Berg (1898, p. 7) reprinted verbatim his notes of 6 years before. To these he added references to the remarks of Nobili (1896) and Wierzejski (1892; 1897), and three new Argentine records: the provinces of Salta and Córdoba and Neuquen Territory.

Strictly in agreement with the pronouncements of Wierzejski (1892) and Berg (1892; 1898), Ortmann (1898, p. 1149), under the family Aegleidae [now better Aeglidae], tersely stated, "Monotype Familie, von der Gattung *Aeglea* Leach gebildet, die einzige Art (*A. laevis* Latr. Taf. lxxiv, Fig. 1**) in Süd-Brasilien, Argentinien und Chile besitzt, wo sie in Süsswasser, besonders in Gebirgsbächen lebt." As the figure cited appears to have been copied directly from Cuvier (1837, pl. 47, fig. 3), quite naturally my comments on the original (p. 435) apply to Ortmann's black-and-white reproduction of it.

Following Cunningham (1870, p. 495), who merely mentions *A.* "*laevis*" as having been "collected in a fresh-water stream in the neighborhood of Valparaiso," no further references to *Aegla* from Chile appeared in literature so far as I am aware, until that of Doflein (1901, p. 135). He added a new locality to its range in that country: Lake Llanquihue, near Puerto Montt. His *A.* "*laevis*" may be *A. abtao.*

Carlos Moreira (1901, pp. 21–23, 84) with fresh material that he had collected in the State of Santa Catharina, Brazil, in his invaluable work on the "Crustaceos do Brazil," fully demonstrated the distinctness of the *A. odebrechtii* of Fritz Müller. At the time, unfortunately, he believed it to be synonymous with Girard's Chilean *A. intermedia.*

In spite of Moreira's able presentation of the case, Ortmann (1902), in his extremely interesting paper on "The Geographic Distribution of Freshwater Decapods and Its Bearing upon Ancient Geography," continued to insist that the genus was monotypic. This stand, which also had been emphasized by Berg (1892; 1898), seemed to close the door on further taxonomic investigations. Most, if not all, subsequent work has apparently been undertaken under the impression that there was only one species of *Aegla*, for it has been confined

"**A. odebrechti* F. Müll. is hiervon nicht verschieden."

largely to morphologic, parasitological, and biological investigations: Porter, 1907; Bennati-Mouchet, 1931a, 1931b, 1932a, 1932b; Porter, 1936[3]; Perez, 1936.

I should not fail to mention here the modest yet very useful checklist prepared by the late Hermann Luederwaldt, naturalist to the Museu Paulista, at the time curator of the invertebrate collections. In his "Lista dos Crustaceos Superiores (Thoracostraca) do Museu Paulista que Foram Encontrados no Estado de S. Paulo" (1919, p. 431) under *A. intermedia*, the species with which *A. odebrechtii* had been thought synonymous, he has specimens from "Perus" and "Alto da Serra," localities that I have included in the distribution of *A. odebrechtii paulensis* (p. 492), and states that the *A. laevis* from Franca is regarded as an "especie duvidosa." From undoubted duplicates of this Franca material received from Dr. H. von Ihering in 1915 the type of a new species, *A. franca*, has been selected. Dr. von Ihering also sent the National Museum specimens of *A. o. paulensis* from Perus.

The foregoing résumé by no means represents a complete bibliography of *Aegla*. It has been assembled for the purpose of setting forth its taxonomic history, indicating its distribution and the sources of my information. More has been done on its parasites than is indicated by the works cited above. The genus and its supposedly unique species are usually, if only briefly, referred to in the more comprehensive general zoological and carcinological texts.

ZOOGEOGRAPHIC NOTES

The recorded occurrences of the several species of *Aegla*, despite the present additions thereto, are altogether too few to admit of more than brief mention of the intriguing speculations that are suggested by their geographic distribution. When this is plotted it appears that each of the major tributaries of the largest rivers possesses its own peculiar species (as exemplified in part of *A. franca*, *A. castro*, and *A. parana*). Although in some cases several tributaries, where near enough together, may have the same species in common (*A. platensis*[4] and *A. uruguayana*[5]), other localities of

[3] Porter remarks that *Aegla "laevis"* has often been collected in the Chilean provinces Valparaiso, Aconcagua, Coquimbo, and Atacama and records the recent accession of a specimen from the Río Maipo, at Santiago.

[4] This species is found in the State of Rio Grande do Sul, Brazil; Uruguay; and Buenos Aires, Argentina. However, I cannot explain its existence in a locality as far removed as Tucuman, Argentina. A confirmation of this occurrence is needed, as well as collections from the vast stretch of country between Tucuman and the eastern seaboard.

[5] This species seems to be rather generally distributed in the River Plate region and more particularly on both sides of the Rio Uruguay and some little distance up the Paraná. For this species we have one tentative record from San Luis, Argentina between 400 and 500 miles to the westward of Buenos Aires. As with *A. platensis* (footnote 4), collections from the intervening stretch of territory, from which we have seen no Aeglas at all, are much to be desired.

FIGURE 40.—Distribution of *Aegla*. This map is based on material that has actually been studied in preparation of this account of the genus. So far as collecting stations are definitely known, they have been accurately plotted; otherwise, their positions are approximations only. The actual locality at which the Rio Grande do Sul, Brazil, specimens of *A. platensis* were taken is not known; it is also unknown for *A. uruguayana* from the Province of San Luis, Argentina. As indicated, three species, *A. platensis*, *prado*, and *uruguayana*, have been found at Montevideo or in its immediate vicinity; at Buenos Aires both *A. platensis* and *uruguayana* occur. As some doubt attaches to the origin of our *A. affinis* material, its occurrence has not been plotted (cf. p. 498, "Holotype").

even lesser extent may support more than one species (i. e., Buenos Aires and adjacent region, two species: *A. platensis* and *A. uruguayana;* and Montevideo and vicinity, three species: *A. platensis*, *A. uruguayana*, and *A. prado*). (Fig. 40.)

The presence of two or more species in one locality, as in Buenos Aires and its environs and perhaps also Montevideo, may have resulted from the tremendous floods to which at least the lower reaches of the several rivers that converge to form the Rio de la Plata are subject. Such an agency would serve to bring together in the same region species that otherwise might exist at some distance from one another.

Generally speaking, most of the species seem rather circumscribed in their distribution (but it must be remembered that the number of records we have for any one species is still very small). If this is so, the Aeglas may be very responsive to their immediate environment, very plastic forms, or else the species are very "young."

The climatic extremes encountered by *Aegla* in its geographic range are considerable (Köppen, 1930, fig. 41). These, too, may have a marked effect not only on the distribution of the species but on their actual development or evolution. Two species that may be a living demonstration of the effects of climatic conditions, which, after all, are but a part of the environment of a species, are *A. jujuyana* and *A. humahuaca.* So far as we know now the two are scarcely more than 70 miles apart at their point of nearest approach, yet, on the basis of precipitation figures alone, they are a vastly greater distance apart. At Jujuy, Province of Jujuy, Argentina, the type locality for *A. jujuyana*, as much as 29.26 inches of rain falls during the year, with some rain in each of the twelve months; at Humahuaca, in the same province, the type locality for *A. humahuaca*, on the other hand, the total yearly rainfall, 6.11 inches, is less than that of the wettest month of the year at Jujuy (January, with 6.65 inches), while five months (May to September) are wholly without appreciable precipitation (Reed, undated MS.; see footnote, p. 500).

If it is true that the least differentiated, least spiny or ornamented species stands nearest the ancestral *Aegla*, then perhaps our *A. jujuyana* is least removed from it in an evolutionary sense. This would place the center of distribution somewhere in the northwestern part of Argentina (Province of Jujuy), which is at variance with Ortmann's belief (1902, p. 389) that *Aegla* was originally indigenous to Chile and subsequently extended into northern Argentina and southern Brazil, or perhaps in the reverse direction.

A. jujuyana lacks or has not yet developed the palmar crest that is so characteristic of almost every other species of *Aegla;* its rostrum

is somewhat intermediate between the flatter, troughed (Pacific or Andean) type [6] present in species found on the east and west slopes of the Andes and the more spinelike, ridge-roofed (Atlantic type) rostra of the species of the great region more or less immediately tributary to the River Plate.

Of special interest in this connection is the fact that we meet also with the so-called Pacific or Andean type of rostrum in the Serra do Mar bordering the Atlantic coast of Brazil, in Santa Catharina (*A. odebrechtii*) and in São Paulo (*A. odebrechtii paulensis*). This discontinuous distribution of the forms with the Pacific or Andean type of rostrum may be apparent only.

From the center in Argentina at or in Jujuy it may be that the forms or variants with the Pacific type of rostrum spread out westward to the Andes and beyond to Chile and eastward to the Serra do Mar of Brazil, while down the vast Argentine Rio Paraná drainage area and across to at least the lower reaches of the Rio Uruguay to Rio Grande do Sul, and to Paraná, migrated those that developed what I have called the Atlantic type of rostrum. Not fitting in with this speculative scheme of things is *A. franca*, from Franca, São Paulo, Brazil, also a species with what might be called the more intermediate type of rostrum found in *A. jujuyana*. It could be a northeastern offshoot of the original or ancestral *jujuyana* stock, or else a reversion to the ancestral condition of a Brazilian form with the Pacific type of rostrum.

The marine origin of *Aegla* appears indisputable, and therefore it is of more than passing interest that the general region in which *A. jujuyana* is centered has geologically had a long-continued marine history, with marine deposits antedating the Devonian, up through the Carboniferous (Berry, 1922). Since Cretaceous time that part of South America seems to have been wholly continental and its waters no longer marine. Undoubtedly the elevation of the land above the sea was gradual, or at least long enough drawn out to allow the ancient forebears of the Aeglas of today to adapt themselves to progressively less saline and increasingly fresher waters.

Although there are a few very fragmentary crustacean remains said to be decapod in the Permian, the first unquestionable fossil decapods, already well differentiated into groups or tribes, families, genera, and species, are Triassic (Zittel, 1913, p. 760; Glaessner, 1929, pp. 404, 462). *Galathea* first appears in the Upper Cretaceous. *Pseudogalathea* from the Lower Carboniferous of Scotland, however, has been assigned to the "schizopoda" by paleontologists (Zittel, 1913, p. 757).

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[6] A more detailed description of these types of rostra will be found on p. 448 of the notes on "characters used in diagnostic key and specific descriptions," and in the key itself, pp. 451 and 454.

Ortmann (1902, p. 341) in his discussion of the geographic distribution of fresh-water Crustacea and its bearing upon ancient geography stated that "the presence of the genus *Parastacus* on both slopes of the Cordilleras (even the identical species is found in one case on both sides, and in this respect *Aeglea* agrees with *Parastacus*) points to a time when the Cordilleras had not yet attained their present elevation. As von Ihering [1907, 1911] has shown, for many groups of animals this chain forms a very sharp barrier, and it does not seem probable that these freshwater Crustaceans are able to cross these high snow and ice covered mountains." Although this may well have occurred, it is not very necessary to presuppose that *Aegla* reached its continent-wide distribution before the Andes attained their present elevation, for, in spite of the height of this great mountain range and the rigors of the climate investing its summits, there certainly are passes, particularly in the lake region of Chile and Argentina, through which Crustacea such as *Parastacus* and *Aegla* might have made their way in times past, if not present.

There must be a pass of this sort above the headwaters of the Rio Petrohue and Lago Todos Santos, where are to be found "on top of the pass of Perez two small streams, one flowing toward the Pacific, the other toward the Atlantic * * * (Eigenmann, 1928, p. 25). Today one can go by bus, automobile, motor boat, and steamer from Chile to Argentina by way of Petrohue, Lago Todos Santos, Peulla (elevation 190 meters), Casa Pangue, Chile (elevation 320 meters), Lago Frias, Argentina, to Puerto Blest on Lago Nahuel Huapi, Argentina (elevation 756 meters).

Insofar as they apply to the same geographic area, I am most anxious to have an opportunity of checking Dr. Eigenmann's findings (1928, especially references given in the partial bibliography on p. 2) based on his studies of the fresh-water fish fauna, its distribution, and origin, against that of *Aegla*. But before that can be done, vastly more *Aegla* material than has yet been collected would have to be assembled.

There seems to be a relation of sorts between our rostral types and such of the "environment complexes in which the sum total of the natural conditions are about equal" of Haseman (1912, pl. 15). The forms with the ridge-roofed, Atlantic type of rostrum more or less occupy Haseman's "Uruguay-Rio Grande do Sul" area plus some additional territory to the south and west, while the Andean or Pacific type, along with the intermediates, *A. jujuyana* and *A. franca*, occupies his "West Andean," "Patagonian," and "Alto Paraná and its affluents" areas. As the forms with Andean type of rostrum are found in each of the last-named "environmental complexes" of Haseman, they must have something in common, be it geologic history, environment, or something else.

In an endeavor better to evaluate the specific characters of *A. odebrechtii paulensis*, I besought Drs. Paulo Sawaya and Ernesto Marcus, of the University of São Paulo, for further material of this subspecies. Although it was not possible for them to obtain it, I did receive some illuminating information regarding the waters of Alto da Serra, the type locality, in a letter from Dr. Marcus:

"Alto da Serra is a mountain pass, 38 km. from São Paulo and 22 km. from Santos by rail, where the high-road and the railway, after having climbed the very steep coast-slope of the Serra do Mar, reach the level of the highland of São Paulo. The brooks of Alto da Serra chiefly fall in cascades down the coast-slope to the narrow lowland of Santos, but some of them also enter the system of the Tieté River that springs in the Serra do Mar, 15 km. distant from the sea, and flows westward through the city of São Paulo and the interior of the state. The mouth of the Tieté in the Paraná is 650 km. distant from the coast."

Our neotype of *A. odebrechtii* is labeled as from Santa Catherina without particulars, but more recent specimens most helpfully provided by Dr. Carlos Moriera, through the kindness of his good friend Dr. G. Kuhlmann, of Blumenau, are from that place in the State of Santa Catharina. One cannot ascertain from which particular watershed, Atlantic slope or westward slope of the Serra do Mar, Fritz Müller's original specimens were taken.

From what Dr. Marcus had to say about Alto do Serra and from what we now know of the occurrence of *A. odebrechtii* at Blumenau, it may be that the forms with the Andean type of rostrum in east-central Brazil are confined to watercourses draining into the Atlantic Ocean direct.

We need not only a great deal of additional material from all parts of the country but, along with it, much more complete locality and environmental data than has been available heretofore before we can hope to elucidate the distributional and taxonomic problems that have been raised by this manifestly preliminary study.

CHARACTERS USED IN DIAGNOSTIC KEY AND SPECIFIC DESCRIPTIONS (Fig. 41)

It is little wonder that the genus *Aegla* has been considered monotypic by so many authorities. In a general way and in many particulars all Aeglas bear a very close resemblance to one another, but there is diversity of form of the cheliped, shape and armature of the orbit, proportion of the carapace and rostrum, relative development of the anterolateral spines, hepatic lobes, cardiac area, and areola, revealing differences of a kind that can no longer be explained merely as variations of a single species.

In his studies on the North American crayfishes of the genus *Cambarus*, Dr. Herman A. Hagen remarked, according to Faxon (1885, p. 17): "If the reader is unable to determine * * * the specimens in his hands * * * through lack of males, the fault lies, * * * not in the principle of classification, but in the scantiness of his material. A species involves two sexes; and until the species is known, it avails little to attempt the determination of a specimen in this difficult genus." [7]

Aegla, likewise, is a difficult genus. Certain forms represent unquestionably distinct species; others have been proposed with some hesitation; two have been rated merely subspecies.

For the present, at least, it has been necessary to confine specific descriptions and diagnostic key characters to as fully developed male specimens as it has been possible to obtain, for in the females the specific characters do not seem to come to full fruition, and with only females at hand it may be difficult or perhaps at times impossible to identify them as to species.

In *Aegla*, the female, in some respects at least, is definitely the weaker sex, and, even if attaining as large a size, it is never so distinctively developed specifically as the corresponding male. This is particularly true of the hands, or chelae. In either sex these are sufficiently asymmetrical to be referred to as the major and the minor chela. The larger chela may be either the right or the left one, but it is usually the left hand, with comparatively few exceptions, that is the larger. The chelae in the female are undersized and underdeveloped, more of the pattern of the minor chela of the male, which, in turn, might be described as being more or less feminine in appearance. The hands or chelae of the males, more especially the larger one, tend to become more and more swollen as the animals get older and larger.

The prehensile margins of the fingers are furnished with a close-set pavement or palisade of corneous scales; this armature is not otherwise mentioned, although the presence or absence of a large, usually conspicuous, "lobular" tooth is mentioned in the descriptions of certain species and in the diagnostic key. A tooth of this nature occurs on the prehensile margin of the fixed finger of the major chela of most species, usually on the corresponding finger of the minor chela also; often the movable finger has a somewhat similar tooth opposed to one on the fixed finger. In three species the prehensile margin of the fixed finger is without such a lobular tooth: *A. sanlorenzo*, *A. jujuyana*, and *A. humahuaca*.

[7] Specimens studied should be of reasonable size and development. It is difficult to deal with specimens of less than 20 mm. in length of carapace and rostrum together and, indeed, even slightly larger individuals are often none too well developed, even though male.

On the outer margin of the movable finger of a number of species near the base there is a definite projecting lobe or angle, usually spined, and, when present, spined in younger specimens if not in the fully developed adults (as in *A. platensis*); sometimes the lobe is reduced in size or suppressed and no more than suggested by some small spinulation at the place occupied by it in other species, or there may be no lobe, angle, or spinulation present at all, the finger being perfectly smooth and rounded off, as in *A. laevis talcahuano.*

The carpus of the chelipeds is armed on the inner margin with a row of strong spines, but in this series I do not include the spine that

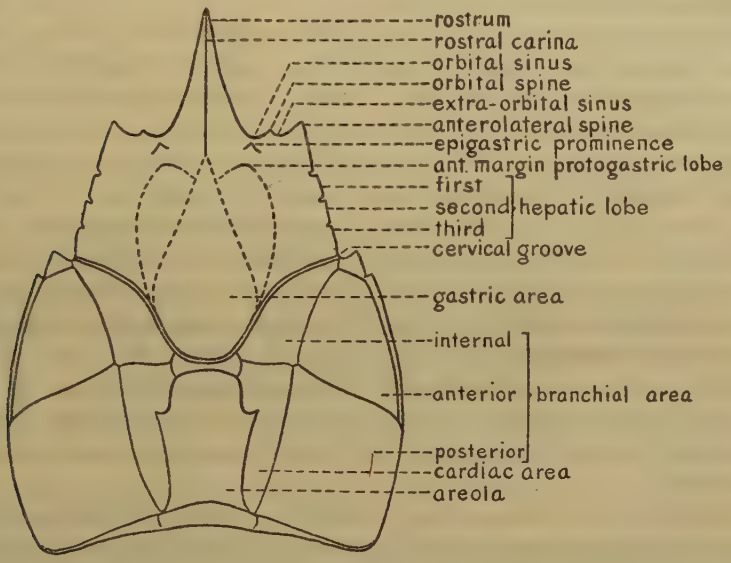

FIGURE 41.—Diagram of *Aegla* carapace, illustrating some of the terms used in describing species.

may arm what I have called the carpal lobe at the anterior inner angle of the carpus. This angle or lobe may be scarcely more than bluntly rounded off and scabrous, sometimes it is more acute and apically spinulated or furnished with a sharp denticle or small corneous spine or two, and it may, as in *A. riolimayana*, carry a slender, clean-cut, sharp, corneous-tipped spine of good size, about as large and conspicuous as the penultimate spine of the series arming the inner margin of the carpus. The carpal lobe is not always so well developed or so well armed in the female as in the male *Aegla;* the descriptions given are based on male specimens only.

More or less parallel to and above the inner spined margin of the carpus there is in most species a definite carpal ridge, usually more or less nodulated, with the nodulations more or less scabrous; on each nodulation there is generally a row of small, corneous scales,

which are arranged more or less transversely in the distal half of the ridge and somewhat or at times almost wholly longitudinally at the proximal end of the ridge. In some species the nodulations become tuberculiform, and in still others, such as *A. denticulata* and *A. castro*,[8] actually replaced by sharp-pointed conical spines.

On the middorsal line of the carpus in a number of species there is a suggestion of a second though much less well formed ridge in the shape of an irregular, more or less scattered, longitudinal row of scabrosities somewhat larger than the others that may roughen the surface of the carpus; in *A. parana* there is a middorsal row of small sharp spines, few in number.

The upper longitudinal margin of the merus of the cheliped may be very sharply and conspicuously spined, or else tuberculated with apices of tubercles scabrous, or virtually unarmed as in *A. jujuyana* and *A. humahuaca.*

The anterior margin of the merus may be perfectly smooth and evenly rounded off (*A. humahuaca*), actually spined, or more or less finely denticulate; in other species it will have middorsally a more or less definite swelling, nodule, lobe, or even tubercle (*A. odebrechtii*) which may anteriorly be minutely spinulated whether the rest of the anterior margin is similarly armed in part or not. As with many of the other morphologic features of *Aegla*, there seems to be considerable variation in the degree of development exhibited by this lobe, so that its specific importance, in the light of our limited knowledge of the members of the genus, cannot be satisfactorily determined.

The basis and ischium of the chelipeds are fused to form one joint. Below, toward its proximal end, there are three transverse, more or less impressed lines. The anterior and posterior lines mark muscle attachments; the middle one constitutes "'a fracture plane' at which separation of the limb takes place in [this and] many [other Crustacea] Reptantia" (Calman, 1909, p. 273). In describing the armature of the "inner margin of the ventral surface of the ischium" only that portion of the ischium proper, or of the fused joint, basis-ischium, beyond or distal to the anterior of these three lines of demarcation is referred to.

There seem to be two principal types of rostra to which the various species of *Aegla* may be referred. The first of these I shall call the ridge-roofed (Atlantic) type. In this the dorsal surface rises from

[8] *A. intermedia,* described by Girard (1855, p. 255) but not yet rediscovered, is described as having two rows of spines on the carpus, its only recognizable or rather distinctive character that it shares with *A. denticulata* and *A. castro.* The second of these certainly does not occur in Chile and so could not be confused with Girard's species, from which *A. denticulata* is at once set off by the longitudinal keeling of its carapace and the conspicuous saw-teeth arming the lateral margin of the posterior portion of the carapace.

the lateral margins to form a very definite, rather sharp carina extending straight forward to the anterior extremity of the rostrum, which is distally not, or at most only slightly, bent upwards. At about the level of the corneae the dorsal carina of this type of rostrum almost always attains a greater height or elevation above the lateral margin than the ventral keel has depth below the margin. Above the level of the lateral margins the rostrum in cross section is definitely triangular, like the roof of a ridge-roofed or gable-ended house. The sides of this roof run straight down from the ridge or carina to the lateral margin either side at about a 45° and often steeper angle (that is, at about the middle of the free portion of the rostrum or between that point and the level of the anterior margin of the corneae). At most these lateral slopes in this first group may be slightly concave; they are, however, never particularly depressed or flattened down, excavate, or longitudinally grooved or troughed.

The other type of rostrum (Pacific or Andean) is fairly flat from side to side and not as a rule at all like the so-called ridge-roofed type, although some species assigned to it (A^2 section of the key, p. 454) may have rather a sharp rostral carina (i. e., *A. riolimayana*). In general, rostra of this type in cross section form more of a flat longitudinally corrugated roof than a steep-sided ridged roof, inasmuch as the sides of the roof either side of the median carina are usually more or less depressed below the lateral margins, and excavate or longitudinally troughed. The height to which the rostral carina rises above the lateral margins, at about the level of the corneae, is usually appreciably less than the depth to which the ventral keel extends below the lateral margins. As a general rule, the dorsal carina tends to fade out or disappear as a carina before attaining the distal extremity of the rostrum, which is generally more or less definitely recurved or bent upward.

A few species seem to have rostra of an intermediate or transitional type that may not have been altogether satisfactorily placed in our key. However, such species have been assigned to that primary group, A^1 or A^2, to which they appeared to be most closely related, all characters considered. *A. jujuyana* and *A. franca* have been assigned to section A^1 of the diagnostic key, and *A. affinis* to section A^2. This last-named species, in the unique specimen at hand, has the dorsal rostral carina somewhat higher at the level of the corneae than the ventral keel is deep, yet its basally broad and flattened rostrum is certainly indicative of a nearer relation to the A^2 than to the A^1 species. *A. jujuyana* and *A. humahuaca* fall into opposed primary sections of our key on the basis of the character of the rostrum; nevertheless, there is in some respects a tantalizing resemblance between the two that suggests a suspiciously close kinship.

Width of the orbital and extraorbital sinuses, where referred to, has been measured in line with the tips of the orbital spines, from the extremity of the spine to the rostral margin, and from the spine to the inner margin or slope of the anterolateral spine. The orbital spine (or spinule) is the actual spine or spinule marking the outer or distal end of the orbital margin, without reference to scabrosities, denticles, scales, or tiny, often microscopic, spinules that may arm or persist on the orbital margin of some species. In most species the outermost of such a series of orbital scabrosities becomes so developed as unmistakably to become the orbital spine or spinule.

The length of the anterolateral spines in relation to the eyestalks is perhaps not a very reliable character, owing possibly to differences in contraction as a result of preservation, yet in a species like *A. sanlorenzo* the anterolateral spines exceed the eyestalks, while in *A. abtao* and *A. riolimayana*, for example, they generally fall short of the posterior margin of the cornea.

I have not been able so far to "pin down" the relative proportions of the areolations of the carapace in a way to permit their satisfactory use in specific description. The areola itself is rather elongate in some species, very squat in a number of others, and quite different in the relation of its posterior lateral margins to the lateral furrows or suture lines of the cardiac area, in at least two nearly related species, *A. abtao* and *A. riolimayana.*

Most of the species of *Aegla* exhibit a tendency toward smoothness and bluntness, even to the suppressing of spines in the older, more developed specimens. In *A. parana* quite the reverse is true; there seems to be an accentuation of the spininess of this species, the fully developed adults are very spiny or at least more prickly appearing than any other one of 20 species or subspecies described.

Aegla parana is the only *Aegla* having the ambulatory legs strongly spined above and, with *A. sanlorenzo* and perhaps also *A. prado*, the only species having reasonably strong spines below near the anterior end of the ambulatory merus. Only one ambulatory leg, the first on the left side, has been figured for each of the species dealt with in this paper, chiefly to show the proportions not as yet clearly proved to be of specific value.

In the majority of the Aeglas the sternal plate between the chelipeds carries no particular armature; in a few species a very definite, often corneous-tipped tubercle or low conical spine is to be found on the median line toward its anterior end; the anterolateral angles of this particular plate are sometimes markedly produced or even spiniform.

Except for the contours of the epimera of the second (in lateral view, apparent first) abdominal somite no particularly noticeable specific differences have been observed in the abdomen or the tail

fan. In the female the abdomen as a whole is relatively shorter and broader than in the male, and the median dorsal area of the respective abdominal somites is relatively wider. This character usually enables one superficially to distinguish males from females. The sexes, however, are definitely distinguished by means of their genital apertures. In the female these open on the coxopodites of the third (antepenultimate) pair of legs, and in the male on the fifth (last) pair of legs. In mature males the vas deferens on each side is externally produced as a thin-walled tube.

KEY TO THE SPECIES OF AEGLA

A[1]. Rostrum definitely ridge-roofed,[9] triangular in cross section; above, with lateral slopes of "roof" running down often at nearly a 45° angle from median carina to lateral margins (these lateral slopes are not distinctly troughed or excavate either side of the median carina as are practically all the relatively flattened rostra of the species under *A*[2], p. 454; at most the lateral rostral slopes may be slightly concave); rostrum sometimes showing a slight upward inclination toward tip, but usually straight and not recurved; rostral carina and scales with which it may be furnished running straight and usually definitely to anterior extremity; front of species belonging to this section of key generally wide or at least moderately wide, rarely somewhat narrowed (as in *jujuyana* and *franca*); orbital spines well developed; sinus (extraorbital) between orbital and anterolateral spines generally of good size, wide or moderately wide, rarely small (*jujuyana*, *franca*, and occasional specimens of *prado*).

B[1]. Hands, though they may become somewhat thick and swollen, never taking on markedly inflated or subglobular appearance of *jujuyana* (*B*[2], p. 453); inner margin of palm always more or less crested, and when crest is low and little developed armed with at least one sharp spine at anterior end; lobular tooth on at least fixed finger usually present and well developed; rarely is this tooth not definitely present, or obsolescent, as in *A. sanlorenzo* (p. 452) (lobular tooth on fixed finger is also lacking in *jujuyana*, *B*[2], p. 453, and *humahuaca*, under section *A*[2], p. 456 of this key); dorsal anterior angle of epimeron of second (in lateral view, apparent first) abdominal somite almost always armed with a spine (sometimes not in *franca*).

C[1]. Front generally very wide, extraorbital sinus at least half, usually more than half of, to nearly subequal to orbital sinus (somewhat narrower than other species in this section is *sanlorenzo*); orbital spines a prominent feature of frontal margin.

D[1]. Posterior margin of ventral surface of first ambulatory merus armed with at least one conspicuous strong spine near distal end about on a level with proximal border of articular membrane[10]; inner margin of ventral surface of ischium of chelipeds armed with two fairly long, well-developed, acute, corneous-tipped spines, one near distal end of joint, the other near proximal end (spines of this size and

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[9] In lateral view at the level of the anterior margin of the cornea, the height of the rostrum, or its carina, above the lateral margin of the rostrum is usually much greater than the depth of the rostrum below the lateral margin.

[10] *A. prado* has a spine of moderate size in this position and *A. castro* a quite small one or two, but both are species with the front only moderately wide, *C*[2], p. 453, this key.

prominence are not found in any species of *Aegla* other than the two grouped here under D^1) ; movable finger without definite or real lobe on outer margin near base, even though margin of finger may sometimes be spiny; epimeron of second (in lateral view, apparent first) abdominal somite with anteroventral border more or less deeply concave; anterior dorsal angle produced to form a sharp spine of good size, ventral angle also produced, narrow, extremity may be blunted, sometimes sharply spined like anterior dorsal angle (in certain large specimens of *parana*).

E^1. Merus of ambulatory legs armed on upper margin with several, usually a full series of, strong, well-developed spines; carpus with ridge above spined inner margin, also well spined, and with a second longitudinal row of normally three sharp spines on middorsal surface, sometimes posterior two spines of this series much reduced or wanting; a well-developed lobular tooth at least on fixed finger of either chela; movable finger without a definite lobe or projection on outer margin near base, sometimes, but not often, a spine or several spinules in this position, not to be unexpected in this otherwise very spiny species; outer margins of hands spined; inner margin of palm forming a comparatively low ridge (palmar crest), which is serrate, serrations spined; sometimes inner margin or ridge fairly straight and serrulate.

parana (p. 458)

E^2. Upper margin of ambulatory merus not armed with a number of strong spines, at most scabrous or small spinulated; carpus with ridge above inner spined margin not spined, scabrous-nodulated, and without a longitudinal row of spines on middorsal surface; prehensile margins of fingers slightly sinuous but without lobular tooth on either fixed or movable finger; no lobe on outer margin of fixed finger near base; outer margins of hands scabrous but not spined as in preceding species; inner margin of palm scarcely crested, broadly rounded off, rising anteriorly in a low keel (palmar crest) to form a single short, sharp spine.

sanlorenzo (p. 461)

D^2. No noticeably strong spine near distal end of ventral posterior margin of ambulatory merus, at most a relatively small spine, tubercle or scale in this position; epimeron of second (in lateral view, apparent first) abdominal somite with anteroventral border more or less straight, at most only slightly concave; ventral angle rounded off; fixed finger at least with a definite lobular tooth of good size one prehensile margin.

E^1. Normally only first hepatic lobe well defined and anteriorly spined, second and third lobes scarcely more than indicated (occasionally one of other lobes fairly well marked on one or the other side of carapace) ; movable finger definitely with a lobe on outer margin near base; in most specimens, especially those of medium and small size, the lobe furnished with a small spine or sharp scale, in many of the larger specimens, such as the type, the lobe frequently unarmed, but always distinctly present and more or less angled; ischium of chelipeds with a not particularly prominent tubercle (not spine), which is furnished with a corneous apex or scale, at distal end of inner margin of ventral surface.

platensis (p. 464)

E^2. All three hepatic lobes well marked in specimens of fair size; in mature or adult specimens anterolateral angles of at least first two and usually all three lobes acute and sharply spined; movable finger without a lobe on outer margin near base; ischium of chelipeds with a conspicuous sharp fairly slender spine at distal end of inner margin of ventral surface---- uruguayana (p. 467)

C^2. Front only moderately wide, extraorbital sinus less than half width of orbital sinus, often only one-third or less than one-third its width; a well-developed orbital spine intervenes between the two sinuses; fixed finger at least with a definite lobular tooth of good size on prehensile margin; movable finger definitely and normally with a spined lobe on outer margin near base; anteroventral border of epimeron of second (in lateral view, apparent first) abdominal somite generally just about straight, may at times be very slightly concave.

D^1. All three hepatic lobes well marked, their anterolateral angles acute and spined, each forming a decided offset in lateral margin (forming three steps, as it were before the cervical groove); anterior margins of protogastric lobes acute-angled, more sharply peaked perhaps than in any other species of *Aegla*.

prado [11] (p. 470)

D^2. The three hepatic lobes plainly indicated but only the first well marked and acutely spined at its anterolateral angle alone, forming a distinct offset in the lateral margin of the anterior margin of the carapace (before the cervical groove); anterior margins of protogastric lobes more or less rounded off, or broadly obtuse-angled.

E^1. Carpus of cheliped with ridge parallel to and above inner spined margin armed with conical tubercles, of which the greater part take the form of acute-tipped conical spines; orbital spines well set off from anterolateral; posteriorly dorsal margin of rostrum merges with general surface of carapace on a level with protogastric lobes; palmar crest somewhat approaching subdisciform, impressed, with upturned margins, reminiscent of *odebrechtii* (p. 455 below)---------- castro (p. 473)

E^2. Ridge above inner spined margin of carpus armed with neither spines nor acute conical tubercles, but scabrous, being furnished with more or less transverse rows of small corneous scales; orbital spine small and placed fairly close to anterolateral; posteriorly dorsal margin of rostral carina ending between protogastric lobes well below general level of carapace behind this point; palmar crest not subdisciform, narrow, longitudinally somewhat troughed or excavate---------- franca (p. 476)

B^2. Hands very thick and inflated and, though scabrous, smooth appearing, as they are rounded off in all directions; inner margin of palm neither crested nor spined, thick and broadly rounded off; fingers with lobular tooth not at all, or at most only very obscurely, indicated; fixed finger of large hand very short and stubby looking (more so perhaps than in any other species of *Aegla*), no lobe on outer margin of movable finger near base; dorsal anterior angle of epimeron of second (in lateral view, apparent first) abdominal somite (based on the very few

[11] The median line of *A. prado* is usually more or less definitely angled the full length of the carapace, in effect carrying the carination of the rostrum back to the posterior border of the carapace in the form of a prominent ridge; carination of this sort is found only in this species and in *A. denticulata* under A^2, B^1, this key, p. 454, in which it is very pronounced.

specimens of this species available) at least spined or with corneous granule or denticle on one or the other side of body in two specimens, in a third specimen, however, on both sides; anteroventral border of epimeron slightly concave to fairly straight_____ jujuyana (p. 478)

A^2. Rostrum more or less transversely flattened[12]; longitudinally troughed or excavate either side of the median carina, often conspicuously so; rostral margins often thickened and appearing more or less raised or upturned; rostral extremity often noticeably recurved, though sometimes straight or only slightly upturned; rostral carina sometimes fading out anteriorly before reaching tip of rostrum, sometimes also merging or fusing with anterior extremity of rostrum to the more or less complete obliteration of carina and the scales with which it may be furnished, corneous scales sometimes continued to tip of rostrum as a feeble, scattered line of scales only; front of species in this section of key relatively narrow, at least in appearance, as compared with species of A^1 section, p. 451; orbital spines usually small, often placed rather close to and sometimes apparently even up the inner slope or margin of anterolateral spine, or wanting altogether.

B^1. Carapace prominently keeled or carinated for its entire length; rostral carina anteriorly fading out in distal third of free portion of rostrum, merging with its thickened distal extremity; lateral margin of posterior portion of carapace (behind cervical groove) conspicuously serrate, sharply notched, and armed with prominent sawteeth or flattened triangular spinelike teeth; orbital spine of good size; extraorbital sinus well formed, a prominent feature of the front, though moderately narrow, being perhaps no more than one-fourth width of orbital sinus; anterolateral spines attaining one-third to one-fourth length of cornea; palmar crest thick, conspicuously spined; movable finger with a sharply spined acute lobe on outer margin near base; dorsal anterior angle of second (in lateral view, apparent first) epimeron produced to form an acute corneous tipped spine.

denticulata (p. 480)

B^2. Except for rostral carina, which may run backward as far as level of anterior margins of protogastric lobes, carapace not noticeably if at all keeled; lateral margins of posterior portion of carapace (behind cervical groove) at most small spinulate or small corneous spined and not at all toothed except perhaps for notch at lateral extremity of cervical groove and at end of suture line immediately behind lateral terminus of cervical groove.

C^1. Anterior third, or even nearly half in some cases, of upper surface of free portion of rostrum gently excavate or concave from side to side with usually no more than trace of forward extension of rostral carina or scales with which its carina is furnished; distal portion of rostrum typically and usually strongly and more or less abruptly recurved; rostral outline moderately broad triangular, carina short but well marked, furnished with a single row of irregularly alternating corneous scales; orbital spine may or may not be developed; nearly always, however, a slight, sometimes abrupt, but always narrow offset between outer end of orbital margin and inner slope or margin of anterolateral spine; this offset about as often without

[12] In lateral view at the level of the anterior margin of the cornea, the dorsal height of the rostrum, or its carina, above the lateral margin of the rostrum is usually much less than the depth of the rostrum below the lateral margin.

as with a small corneous scale or spinule (present in type), which may represent or take the place of an orbital spine; offset usually with slight notch or incision next to anterolateral spine; palmar crest thick, almost obsolescent, upper surface not impressed or excavate. Dorsal anterior angle of epimeron of second (in lateral view, apparent first) abdominal somite normally and usually rounded off and unarmed; very rarely does one find a corneous scale or denticle or two or even a small spinule, and then usually on epimeron of one side only---------- papuda (p. 483)

C^2. Not even distal third of rostrum concave from side to side without noticeable intervention of dorsal carina; rostrum carinated virtually to its distal extremity or else anterior fourth or so of free portion of rostrum so thickened that rostral carina and any longitudinal troughing that dorsal surface of rostrum may otherwise have either side of carina becomes more or less completely obliterated in this terminal fourth of rostrum.

D^1. Dorsal anterior angle of epimeron of second (in lateral view, apparent first) abdominal somite rounded off and unarmed.

E^1. Margins of palmar crest appreciably and noticeably upturned, upper surface of crest definitely impressed or excavate; crest somewhat or quite subdisciform; movable finger with a definite though sometimes small, but always spined or spiny lobe or projection on outer margin near base; hands more or less subovoid in outline; rostrum normally not exceeding eyestalks by as much as length of cornea; rostral carina not even faintly traceable behind anterior margins of protogastric lobes; orbital spine and extraorbital sinus definitely present; latter always distinct though sometimes small.

F^a. Palmar crest conspicuously large and expanded, subdisciform, noticeably excavate, much as if it had been impressed or pinched out while soft with the ball of one's thumb; margin of crest obscurely serrate at best, scabrous and small spinulose; rostral carina furnished with an irregularly alternating double (in very small part, at times triple) row of small corneous scales---------- odebrechtii (p. 487)

F^2. Palmar crest only moderately large or expanded and, though somewhat rounded off, not particularly subdisciform, more or less longitudinally troughed; margin of palmar crest definitely serrate; rostral carina almost smooth and naked appearing on top, at most sparsely and well-nigh microscopically scaled where it appears scaled---------- odebrechtii paulensis (p. 490)

E^2. Margins of palmar crest not noticeably upturned, crest at best only slightly or narrowly and very shallowly, if at all, troughed or excavate, not particularly impressed looking; crest more subrectangular in outline than subdisciform; at most only a slight lobe or projection on outer margin of movable finger near base; margin of finger rough-spinulose and usually with a few larger spinules on a slight elevation near base of finger, better seen in smaller than in larger specimens.

F^4. Definite orbital spine or spinule present, set off from anterolateral spine by a small, narrow sinus or notch; palmar crest thinning out to its outer margin, which is sharply though not deeply saw-toothed, and sharply small-spinulose, not troughed or ex-

cavate; hands more or less subovoid in outline; rostrum plainly troughed either side of well-defined, narrow, median carina. **neuquensis (p. 493)**

F^2. No orbital spine or spinule as such (in unique type specimen), outer margin of orbit merges with inner slope or margin of anterolateral spine without appreciable offset; small spinules or spiniform scales on orbital margin tending to run up onto sides of base of anterolateral spine; outer margin of palmar crest fairly thick, rough-scabrous and somewhat lumpily toothed; upper surface of crest longitudinally and narrowly, slightly troughed; hands more or less elongate-subrectangular; rostrum only very shallowly and more or less obsolescently troughed either side of rather blunt and rounded-off median carina---------- **affinis (p. 495)**

D^2. Dorsal anterior angle of epimeron of second abdominal somite armed with a small spine or spinule (very rarely is angle armed with two little spines or spinules).

E^1. Fingers lacking lobular tooth characteristic of most species of *Aegla*, fixed finger at most with only slight sinuosity on prehensile margin; no lobe on outer margin of movable finger near base, although a few larger corneous scales or small spinules sometimes occur there; palmar crest low and thick, very broadly triangular in cross section, dorsal surface at most very shallowly and obsolescently excavate, more scabrous than spinulated, though slightly marked serrations of blunt crest may be spinule tipped; rostrum triangular, thick-looking, only shallowly troughed either side of blunt, proximally more or less swollen median carina. **humahuaca (p. 498)**

E^2. Fixed finger at least with a well-developed lobular tooth on its prehensile margin.

F^1. Rostrum more or less lingulate (tending to be tongue-shaped rather than sharply triangular), lateral margins often more or less subparallel in midsection of free portion of rostrum; rostrum in lateral view noticeably bent downward, distally recurved; orbital spine or spinule present or not present, when present frequently much reduced, often no extraorbital sinus or notch (small extraorbital sinus and orbital spine or spinule perhaps always present in *A. laevis talcahuano*).

G^1. Typically no orbital spine, normally outer end of orbital margin merging with inner slope or margin of anterolateral spine with little or no demarcation; sometimes a slight sinuosity developing, or a more or less insignificant oblique offset; rarely ever a real offset, notch, or projection with an orbital spinule on one or the other side at all like the condition found in either of the two species immediately following; rostrum broadly lingulate, more or less triangularly so, but never sharply triangular as in *abtao* and *riolimayana* (F^2, G^1, and G^2 below); movable finger with a distinct, usually spined or spinulated lobe on outer margin near base; palmar crest not particularly prominent, posterior margin of crest usually noticeably upturned, troughed or excavate with upturned and broadly and shallowly serrate margins.

concepcionensis (p. 501)

G^2. Orbital spine, or the orbital spinule usually taking its place, generally present on one or both sides of front; extraorbital sinus well formed but narrow or reduced to a mere notch between orbital spinule and anterolateral spine; in the absence of a real orbital spine or spinule (as in about half the representatives of *A. laevis*) virtually always a well-marked, often abrupt, sometimes nearly right-angled offset between inner slope or margin of anterolateral spine and outer end of orbital margin; rostrum somewhat narrowly lingulate, subparallelism of margins of midsection often rather pronounced.[13]

H^1. Movable finger with distinct and usually spined or spinulated lobe on outer margin near base; palmar crest only somewhat excavate or impressed with upturned and distinctly serrate spine or sharp-scaled tipped margins.

laevis (p. 504)

H^2. No lobe on outer margin of movable finger near base; palmar crest noticeably excavate, impressed, or longitudinally troughed, margins upturned and more or less entire, obsolescently if at all serrate (remotely somewhat reminiscent of the palmar crest in *odebrechtii*).

laevis talcahuano (p. 508)

F^2. Rostrum distinctly and sharply triangular, lateral margins tapering from base to tip (in no part at all subparallel), rostrum in lateral view running about or nearly straight forward, with only slight if any upward inclination distally (neither upcurved nor recurved); orbital spine or spinule and extraorbital sinus, though sometimes small or narrow, always definitely present.

G^1. Rostrum moderately broad and, though sharply triangular, rather broadly so, gradually and not particularly narrowed distally; rostral carina dorsally furnished with two more or less distinct rows of corneous scales for greater part of length, anterior to middle of free portion of rostrum two rows or scales running together to form a single sometimes somewhat scattered row, which continues about to the anterior extremity; areola widening behind____ abtao (p. 510)

G^2. Rostrum narrowly and sharply acuminate (stilletolike); rostral carina sharp crested for greater part of its length and furnished with a single at times slightly wavering row of corneous scales, which in some specimens tends to become a double row of more or less closely juxtaposed scales a little before distal extremity of rostrum; areola narrowing posteriorly_____ riolimayana (p. 513)

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[13] The rostra of the two species falling within this section of the key, in general, so far as the specimens I have seen are concerned, look somewhat amorphous, as if they had been partially melted and then solidified.

Family AEGLIDAE

Genus AEGLA Leach

AEGLA PARANA, new species

FIGURES 42, 43; PLATE 25, A

Description.—A large species attaining a length of carapace and rostrum together of at least 44 mm.

Carapace slightly convex anteriorly and laterally, medially quite flattened; front very wide. Rostrum long, slender-spinelike, sharply carinated, ridge-roofed, triangular in cross section, exceeding eyestalk by two to three times the length of the cornea; crest of rostral carina furnished with a closely juxtaposed double row of good-sized corneous scales about to level of corneae, anterior to which the row becomes single with scales often closely set, sometimes a bit separated from one another; posteriorly the carina proper ends just before the anterior margins of protogastric lobes, larger scales of carina often stop at level of epigastric prominences. Epigastric prominences well marked, though low tubercular, furnished with one or more, usually several, corneous scales, individually about the size of the scales on the rostrum; anterior margin of protogastric lobes, though only slightly raised, distinctly marked, in part at least, by a short row of sizable corneous scales, of which the apical one is larger and heavier than the others. Areola relatively long and narrow, lateral sutures of cardiac area markedly converging behind.

Orbits fairly wide, moderately deep, separated from the wide extra-orbital sinus either side by a conspicuous strong yet slender spine; the extraorbital sinus exceeds half the width of the orbital one, often about equal to three-fourths of its width.

Anterolateral spine long, strong, acuminate, reaching to middle of cornea or beyond, sometimes nearly as long as eye. Anterolateral angle of first hepatic lobe sharply and strongly spined, spine more or less exserted, second lobe may also be spined, or, like the third, carry a good-sized corneous scale. Angle on lateral margin behind cervical groove spiniform and armed with one, usually several, smaller, sharp, corneous-tipped spines on its posterior slope; angle behind notch which follows the preceding angle also spined; entire lateral margin of posterior portion of carapace (behind cervical groove) conspicuously armed with a continuous fringe of sharp spines; other species may have the corresponding margin more or less small-spinulose or scabrous, but in none (except *A. denticulata*) is it as strongly and well spined as in this one.

Large hand more or less subquadrate, thick, but not inflated or particularly swollen looking, moderately rough scabrous, armed on

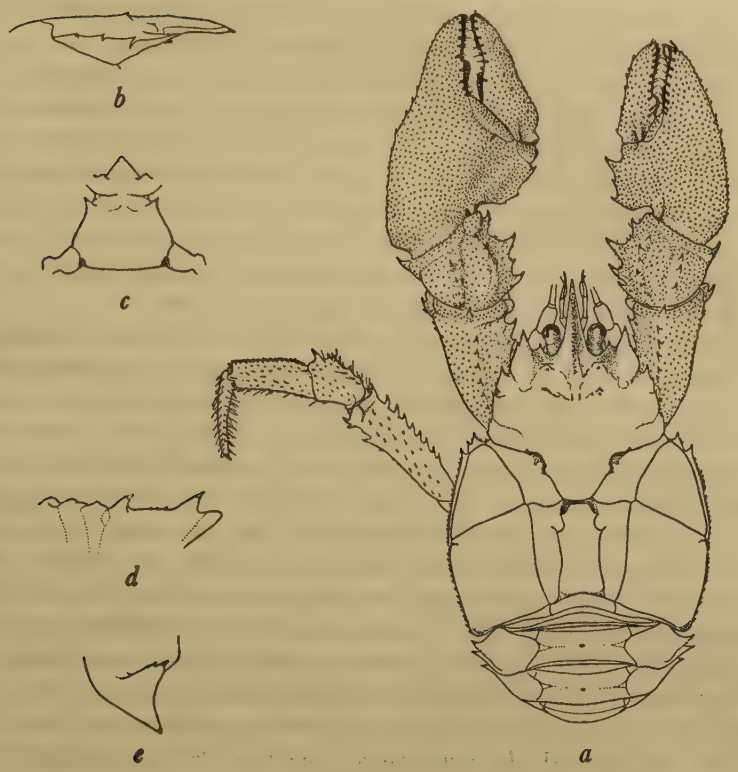

FIGURE 42.—*Aegla parana*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

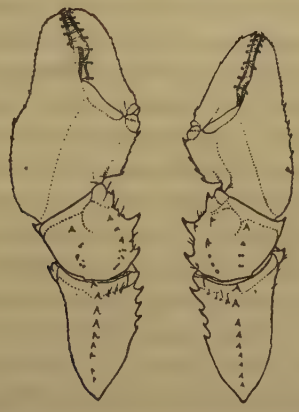

FIGURE 43.—*Aegla parana*, new species, male paratype: Chelipeds, showing variation in shape of hands and palmar crest. Natural size.

outer margin (of both hands) with a number of spinuliform scales, or sharply pointed, short spines. Movable finger with no true lobe on outer margin near base, at best a low, scabrous thickening, but so slightly developed that it in no sense can be considered a lobe such as is found in certain other species of *Aegla;* both fingers with a stout lobular tooth. Palmar crest a comparatively low ridge, broadly serrate, angles of serrations sharp-spined; sometimes (fig. 43) serrations are virtually obliterated so that free edge of crest is nearly straight, and furnished with some corneous, perhaps pointed, scales and a fair-sized spinule anteriorly and posteriorly.

Carpus sharply and strongly spined on inner margin, ridge above this row of spines also sharply and strongly spined; apparently there is an additional longitudinal row of spines running along the median line of the dorsal surface of the carpus; this normally seems to be armed with three good spines, sometimes one or both of the posterior spines may be reduced to a stout scale, or a short-conical spinule. Dorsal longitudinal margin of merus of cheliped armed with a row of large, sharp, well-developed spines; at middle of anterior margin of merus a strong spine about as large as anterior spine of dorsal longitudinal margin. The inner margin of the ventral surface of the ischium of the cheliped is armed with at least two fairly long, strong, more or less subequal corneous-tipped spines; among the Aeglas two ischial spines of this size and prominence are found only in this species and *A. sanlorenzo* (see also last paragraph under "Remarks," *A. castro*, p. 475).

Meri of ambulatory legs likewise normally armed with a series of strong spines along upper margin; sometimes the series is not quite so large and regular as in the type, yet enough of it is present to distinguish this species from all other Aeglas by this feature alone; near distal end of posterior margin of ventral surface of merus, at the level of the posterior end of the articular membrane of the joint, there is a strong spine, behind this there may be a second smaller one, and at the extreme anterior end a small spine or two.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite produced into a long, sharp spine strongly buttressed behind by a conspicuous ridge or angle running obliquely longitudinally back on the epimeron; anterior margin below this spine deeply concave, ventral angle narrowly produced, subacute and often, as in the type, tipped by a strong corneous spine.

Color.—A. parana is very beautifully marked. The general body or ground color is a dark, almost black, bottle green; in one instance a dark grass green with faint suggestions or touches of parrot green; sometimes bister×olive-green to a blackish bister with raw-umber higher portions.

The chelipeds and chela for the greater part have the same general color as the rest of the body, except that as much as the distal half of the fingers may be a bright French or a dark turquoise blue; the dark grass-green specimen has marine or indigo blue on the fingers of the left hand and royal purple on the right; one other specimen has the greater part of the hand Indian purple with prune purple distally on the fingers.

The most proximal portions of the chelipeds and ambulatory legs, more or less hidden by the lateral margins of the carapace, take on a dirty cream-buff to clay color; the under parts of the body are similarly colored, except that the sternum sometimes is a Mars brown, and the outer surface of the turned-under abdominal somites and telson are often faintly tinged with a greenish, bluish, or purplish color much like a poorly dyed, plain-colored Easter egg. The ambulatory legs, usually greenish like the body, are sometimes flushed with purple or blue, especially the under side of the dactyls; in other specimens they may be an almost buff or dirty cream-buff; in two cases it was noted that the articulating membranes are brightly colored ferruginous in one, coral red in the other. Distally, the third maxillipeds at least occasionally are faintly tinged with blue, or the last joints even take on a turquoise blue color. The antennal flagella are usually colored like the carapace. (For colors see Ridgway, 1886.)

Holotype.—A large male, U.S.N.M. No. 80016, the largest of several collected at Rio Negro, October 21, 1925, in a wicker fishpot kindly baited and provided by Carlos Zornig, of the Hotel Zornig. This is the largest individual *Aegla* I have ever seen. It measures a full 44 mm. in length of carapace and rostrum together and 75 mm. from tip of rostrum to posterior margin of telson extending abdomen as much as possible without breaking; from telson margin of extended abdomen over extended chelipeds, 108 mm.

Distribution.—The species so far has been collected only at Rio Negro, Paraná, Brazil, where I secured a modest number of specimens by means of the fishpot and also a cast net used by a local fisherman at night over a brief period from October 12 to 14 and again on October 21 and 22. On the early morning of the 14th the air temperature was 58° F., while the water near the bank at about a foot below the surface registered 64° F.

AEGLA SANLORENZO, new species

FIGURE 44; PLATE 25, B

Description.—The unique type male is a specimen of just about 29 mm. in length of carapace and rostrum taken together. The arms are broken and the right, minor hand is shattered; only the first left leg is complete, though detached. In the accompanying drawing the specimen is "restored."

Carapace slightly to moderately convex, front wide. Rostrum moderately long, spinelike, triangular in cross section, exceeding eyestalks by about three times the length of the cornea; rostral carina sharply ridged, furnished with a double row of light corneous scales closely juxtaposed and more or less alternating up to a little anterior to the level of the posterior margin of the orbits, where the scales form a single, closely set row of scales which extends to the anterior extremity of the rostrum.

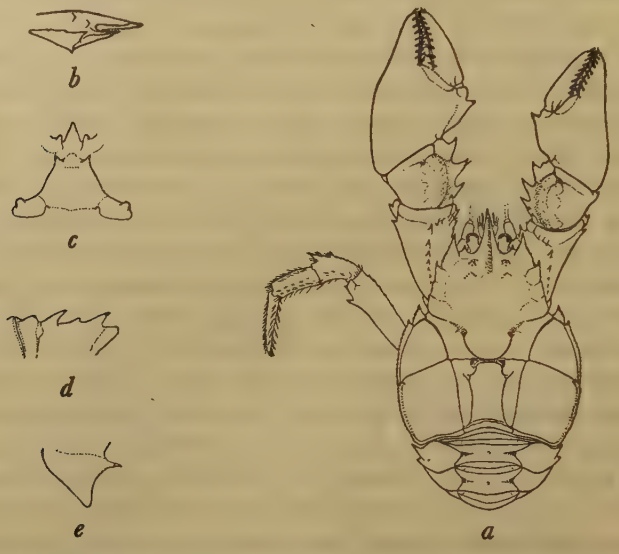

FIGURE 44.—*Aegla sanlorenzo*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

Epigastric prominences low, with few small beadlike scales on summit; anterior margins of protogastric lobes forming an acute angle outlined by a closely-set row of light-colored scales; similar scales scattered elsewhere over carapace. Areola moderately wide, fairly long.

Orbits only moderately wide, moderately deep, separated from the fairly wide extraorbital sinus by a well-developed orbital spine; extraorbital sinus about one-half the width of orbital.

Anterolateral spine long and slender, sharply spiniform, exceeding the cornea. First hepatic lobe sharply spined anteriorly, spine ending in a slender corneous tip and appreciably exserted; second and third hepatic lobes set off by not very prominent, rather weak notches, margins corneous-granulated or scaled.

Larger hand very smooth appearing, but under glass finely granulated (or minutely scaled like the carapace), more or less subrectangular, gently convex, rising to an apparent median longitudinal angle extending from a little distance behind the posterior margin of the sinus between the fingers to the posterior margin of the palm; inner margin of palm can scarcely be said to be crested, it is broadly rounded off but rises at a little distance before the anterior border to form a conspicuous, though short, acutely corneous-tipped spine; the smaller hand of this unique specimen is crushed but seems to have the same conformation as the larger one. There is no lobe on the outer margin of the movable finger near the base; the prehensile margins of both fingers are slightly sinuous, but neither reveals any trace of the large lobular tooth found in most species of *Aegla*.

Carpus of cheliped granulated like hand; ridge above spined inner margin more or less obsolescent, at least not very prominent, lobe at anterior angle produced to form a strong prominent spine. Dorsal longitudinal margin of merus strongly and sharply spined above; anterior margin unarmed, finely scabrous. Inner margin of the ventral surface of ischium is armed with a pair of well-developed strong spines; only on the left (figured type) ischium does a small acute spine intervene between the two large spines; on the right the inner margin of the joint is uninterrupted.

Merus of first ambulatory leg scabrous above; armed with an anteriorly directed spine on the posterior border of the ventral surface a little behind the level of the posterior margin of the articular membrane; there is also a small corneous point or spine close to the anterior end of the ventral margin.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite produced into a slender, sharp spine; margin of the epimeron below this spine deeply concave; ventral angle strongly and narrowly produced, though bluntly rounded off at its extremity.

Holotype.—The unique male specimen collected by Dr. Carlos Spegazzini in the Rio San Lorenzo, Salta, Argentina (M.A.C.N.[14] No. 7099); length of carapace and rostrum taken together, 29 mm.

Remarks.—This species is certainly more nearly related to *A. parana* than to *A. uruguayana*, which it superficially resembles. The strong ventral spine on the ambulatory legs and the shape of the epimeron of the second abdominal somite point in the direction of *A. parana;* moreover, the inner ventral border of the ischium of the cheliped, like that of *A. parana*, is armed with a strong hooked spine at the anterior end as well as at the posterior end of the joint but, unlike

[14] Museo Argentino de Ciencias Naturales.

it, it may have a small tubercular or nodular projection intervening between the anterior and posterior spine.

The hands, however, appear to resemble more closely those of *A. uruguayana* in most particulars: Low or no crest, anterior sharp spine on inner margin, and no lobe on outer margin of movable finger. The palm of *A. sanlorenzo* is relatively shorter than that of *A. uruguayana*, and the fingers lack the lobular teeth present in the last-named species.

AEGLA PLATENSIS, new species

FIGURES 45, 46; PLATE 25, C

Aegla laevis R. VON IHERING, Atlas da fauna do Brasil, pl. 4, fig. 17,[15] 1917.

Description.—A large species, attaining a length of carapace and rostrum together of about 39 mm.

Carapace, though gently convex, more or less flattened, front very wide. Rostrum an elongate ridge-roofed, narrowly triangular spine, exceeding eyestalks by about twice the length of the cornea; rostral carina somewhat blunt, only fairly sharp ridged, furnished with three to five rows of cornified, sometimes almost microscopic punctae, except very close to anterior extremity of rostrum, where there is an irregular, short, single row of larger corneous scales; carina runs back as far as the anterior margins of the protogastric lobes, neither protogastric lobes nor epigastric prominences at all well marked. Anterior margins of protogastric lobes broadly obtuse angled, not at all tuberculiform at apex of angle. Areola widens noticeably behind.

Orbital sinus wide, but only a little longer and a little wider appearing than extraorbital sinus, orbital spine well developed. Anterolateral spines large and conspicuous, reaching nearly or about to middle of cornea. Anterolateral angle of first hepatic lobe is produced into a prominent, sharply acute spine; second and third hepatic lobes may be indicated, but are not at all well marked; if spinulated, spinules no larger than spinules found elsewhere on lateral margin of anterior portion of carapace; occasional specimens may have a small notch marking the second hepatic lobe on one or the other side of the carapace, perhaps never on both sides.

Hands large, broadly ovate, much flattened as compared with most species of *Aegla*. Movable finger more or less cylindrical, rather slender in well-developed specimens, and arched, making a considerable gape between the fixed and movable fingers; movable finger with

[15] This figure of Rudolfo von Ihering is original and is undoubtedly based on one of a lot of specimens collected by his father Hermann von Ihering, in the State of Rio Grande do Sul (collector's No. 619). The Rio Grande do Sul record given under "Distribution" of *A. platensis* below is also based on a specimen from that lot of material, presented to the U. S. National Museum by Dr. H. von Ihering in 1915. A comparison of this specimen and the figure convinces me that *A. platensis* is the species represented.

a noticeable lobe at base, blunt angled in the largest specimens (and in the type) but usually sharp angled and anteriorly spined at least in specimens up to 33 mm. in length of carapace and rostrum taken together. Upper margin of palms somewhat compressed, forming a low ridge (palmar crest), most developed at its posterior angle, or "heel"; margin of crest more or less irregular, angulations armed with small, sharp, corneous spines or spinules, sometimes corneous

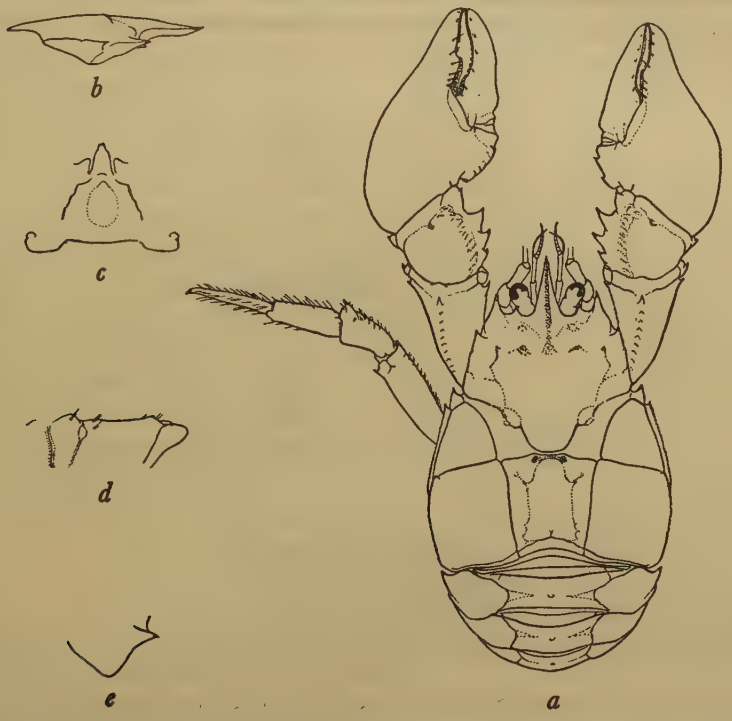

FIGURE 45.—*Aegla platensis*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

spinulate at anterior angle, border of posterior angle, or heel, somewhat upturned, forming a very slight, short, very shallow trough between border of "heel" and margin of palm proper. In young specimens the margins of the crest may be quite spiny, but this condition is not carried over into the more developed, adult stages.

Ridge of carpus of cheliped above inner spined margin somewhat lumpy and obliquely scabrous ridged, but not spined; anterior internal lobe or angle of carpus produced into a short, stout, conical spine. Upper longitudinal margin of merus with a strong, moderately stout to slender spine at anterior end; anterior margin with only a slight,

denticulated convexity on margin in line with spine at anterior end of dorsal longitudinal ridge. Inner margin of ventral surface of ischium not spined, at most with only a low swelling at anterior end, and perhaps a very slight convexity at posterior end.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite produced to form an acute corneous-tipped spine buttressed behind by a blunt ridge or thickening of epimeron; anterior margin below spine more or less straight, at most only slightly concave; ventral angle rounded off.

FIGURE 46.—*Aegla platensis*, new species, male paratype. Natural size.

Holotype.—The largest male, U.S.N.M. No. 80018, from a lot of 2 males and 2 females collected at "Isla Flores" [? Tigre, Buenos Aires, Argentina] by Dr. W. E. Safford, U. S. N., at the time attached to the U. S. S. *Mohican*, May 4, 1887. This specimen measures slightly over 38 mm. in length of carapace and rostrum together; the largest female is 33.5 mm. long.

Remarks.—This species and the next are in many respects very similar. They differ, however, in a number of particulars. The movable finger in this species has a lobe on the outer margin near the base; no such lobe seems ever to be developed in any specimen of *A. uruguayana*, male or female; moreover, in case of doubt, the presence of a well-developed sharp spine at the anterior end of the inner border of the ventral surface of the ischium of the cheliped

will always distinguish *A. uruguayana* from *A. platensis*, even in very small juvenile specimens.

In well-developed females of *A. platensis* the hands are flatter than in the males, and also somewhat narrower; the fingers are much less strong, and more slender.

The sternal plate between the chelipeds carries a low, blunt keel, which anteriorly may at times be raised a bit or project forward as a low, ventrally keeled, conical tubercle; there is some suggestion of similar keeling on the following sternum between the first pair of ambulatory legs, which, though elevated about as much as the preceding keel, forms a very broad, low swelling, larger and broader at the anterior end than at the posterior.

A. uruguayana has a low median swelling on the anterior half of the sternum between the chelipeds, a little peaked at the forward end, but not appearing so keeled as in *A. platensis;* often in specimens of medium size this swelling or projection takes on the form of a stout, conical, corneous-tipped spine inclined obliquely forward.

Distribution.—In addition to the type lot, I have seen various specimens from the vicinity of Buenos Aires and from Tigre nearby, where Dr. Martin Doello-Jurado, director of the Museo Argentino, most kindly took me collecting one day; from the Prado and the Arroyo Miguelete, Montevideo, and Bahia de Colonia, Uruguay; Rio Grande do Sul, Brazil; and one specimen that appears to be this species from Tucuman, Argentina.

AEGLA URUGUAYANA, new species

FIGURE 47; PLATE 25, D

Description.—A species of good size, attaining a length of carapace and rostrum together of 33 mm.

Carapace moderately convex, well areolated, front wide. Rostrum long, slender, and sharply acuminate, above lateral margins distinctly triangular in cross section; rostrum in the type specimen exceeds the eyestalks by 1½ to nearly 2 times the length of the cornea (in very small specimens rostrum may be only little longer than eyestalks); rostral carina prominent, multiscaled, scales intermingled, plainly marked backward to a little behind the level of the anterior margin of the protogastric lobes. Epigastric prominences just low swellings situated on the forward slope of the carapace between the orbital margin and the much higher lying anterior margins of the protogastric lobes; the anterior margins sharply marked by a row of five or six light corneous beadlike scales. Areola of good size.

Orbits very wide and shallow, distinctly set off from extraorbital sinus by an orbital spine of good size, extraorbital sinus about three-fifths as wide as the orbital sinus.

Anterolateral spines of carapace scarcely reach posterior margin of cornea, in some specimens a little beyond this level. Anterolateral angles of all three hepatic lobes well marked, at least the first (in the type all three) sharply acute and spined; first spine long and slender and appreciably exserted; the second about half the length of the first; the third in the type as much reduced again.

Large hand quite smooth appearing, only very finely scabrous, elongate, subrectangular, upper surface gently convex, with pair of faint yet discernible low obsolescent ridges converging from each of

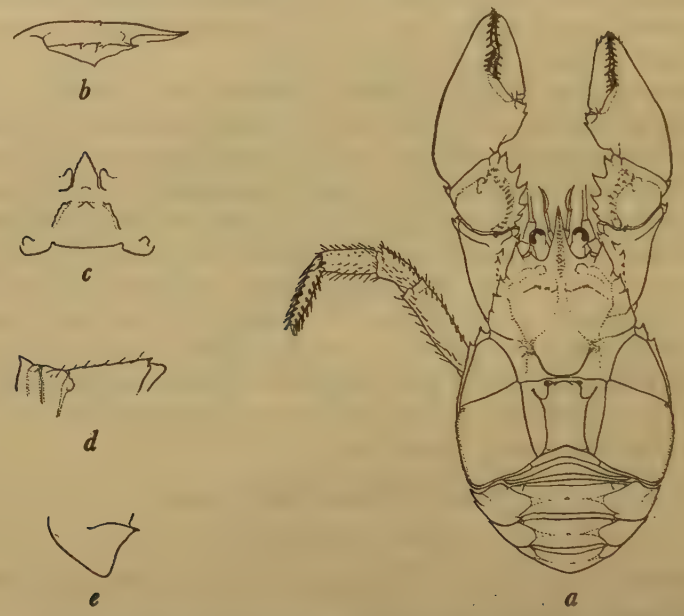

FIGURE 47.—*Aegla uruguayana*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

the posterior upper angles of the palm to meet and become one about the middle of the length of the palm, shortly thereafter to fade out before reaching the posterior margin of the sinus between the fingers. No lobe on outer margin of movable finger near base; tooth on fixed finger well developed. Virtually no palmar crest, inner margin of palm more or less obsolescently and rather broadly carinated, carina armed anteriorly with a sharp corneous spine.

Carpus of cheliped with acutely spined lobe at anterior-internal angle. Dorsal margin of merus armed with a longitudinal row of strong spines; at anterior end this row of spines appears to turn

inward [16] for inside and often a little in advance of the anteriormost of the longitudinal series there is one and sometimes two or more almost equally strong, though usually somewhat more slender, spines in an oblique row (the second spine of this row is always smaller than the first and if there are additional spines they are in turn smaller than the second one); anterior margin of merus with small rounded lobe or tubercle. The inner margin of the ventral surface of the ischium is armed with a well-developed spine anteriorly and only a low swelling or slight nodulation at the posterior end.

Anterior dorsal angle of the epimeron of the second (in lateral view, the apparent first) abdominal somite much produced, ending in a sharp corneous spine; anterior margin of this epimeron below the spine slightly concave and nearly vertical in direction; ventral angle very little less than a right angle, apically rounded off.

Holotype.—The only large specimen, a male, in a lot of 2 males and 4 females, of which the rest are all under 14 mm. in length of carapace and rostrum taken together. This measurement in the holotype about equals 33.3 mm. These specimens were obtained by the Captain Marshall Field Brazilian Expedition of the Field Museum, October 20, 1936, 14 kilometers northeast of San Carlos, Uruguay, Karl P. Schmidt collector, and are in collections of the Field Museum. The holotype carries Field Museum number 2287; paratypes, 2288.

Remarks.—This species is characterized by its long, slender rostrum, triangular in cross section, or, as one might say, ridge-roofed rostrum; the only slightly convex, more or less subrectangular, virtually uncrested hands; and by the distinctly marked hepatic lobes of which the anterolateral angles of at least the first two and often all three are spined. (See also "Remarks" under *A. platensis* and *A. prado.*)

Distribution.—This species seems to be widely distributed on both sides of the River Plate, definitely eastward as far as Punta del Este, Uruguay; south and westward to Buenos Aires, Isla Flores, Belgrano, and Lujan, Province of Buenos Aires, Argentina; north and westward to Paysandu, Uruguay; and Concordia and Paraná, Entre Rios, Argentina. One specimen, a small male, one of the Aeglas examined by Nobili, from San Luis, Argentina, received from the Turin Museum, seems to be near, if not identical with, this species. It is, however, rather far removed from the above indicated range of *A. uruguayana.* This may be due to the lack of collections from the intervening region, or perhaps even to the lack of development of the specific characters in this small specimen.

I have seen specimens from the above-mentioned range-determining localities and also from Paso de la Arena, Arroyo Miguelete (very

[16] A somewhat similar condition occurs in *A. affinis,* p. 495.

small specimen, determination doubtful), St. Lucia, River San José, Rosario, from near Carmelo, Nueva Palmira, and Frey Bentos, Uruguay; and Arroyo El Gato, Guateguaychú, Entre Rios, Argentina. One small lot examined (M. C. Z. No. 10478) was labeled Maldonado, Brazil (I believe that this should be Maldonado, Uruguay).

AEGLA PRADO, new species

FIGURES 48, 49; PLATE 26, A, B

Description.—A small to moderate-sized species. One of the largest specimens I have seen measures about 25.5 mm. in length of carapace and rostrum taken together.

Carapace usually very convex, more so than in any nearly related species; front fairly wide, narrower than in *A. platensis*. Rostrum sharp, spinelike, ridge-roofed, exceeding eyes by at least twice the length of the cornea; the rostral carina is furnished with several longitudinal rows of irregularly placed, tiny corneous scales; the carina is continued backward past the anterior margins of the protogastric lobes, at the level of which it widens out to form a low, blunt ridge that may be more or less readily traced to the posterior margin of the carapace; it is interrupted only by the cervical groove; this ridging or transverse angling of the median line is not so prominently developed in all the specimens at hand, yet it is a conspicuous feature in a very considerable number of the larger representatives of the species. Though otherwise quite distinct this was the first species I personally encountered in South America that had any real resemblance to Nicolet's prominently keeled Chilean *A. denticulata.*

Epigastric prominences are low to obsolescent swellings; anterior margins of protogastric lobes sharply acute-angled, apex raised up and almost small-tuberculiform, more prominently so in the smaller than in the larger specimens.

Orbits of good size, much larger than extra-orbital sinuses, which are relatively moderate to small in size; orbital spine small, standing fairly close to anterolateral spine.

Anterolateral spines well-developed, reaching not quite to middle of cornea. All three hepatic lobes well marked and corneous spined, and each well set off from the others, so that the lateral margin of the anterior portion of the carapace narrows stepwise from the cervical groove to the anterolateral spine.

Hands very swollen looking, more or less broadly ovate. Movable finger with a plainly marked, generally small-spined lobe on outer margin near base. No particular crest developed on inner margin of palm, and no such posterior angle or "heel" as in *A. platensis;* however, there is a noticeable spine or two (sometimes more, and then

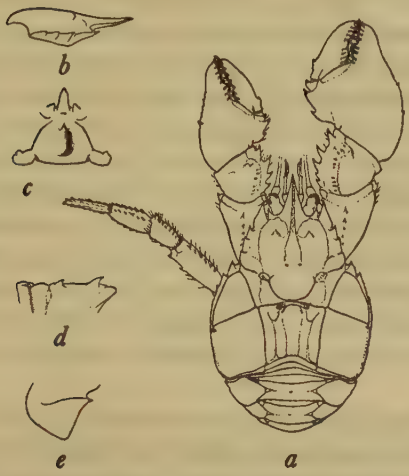

FIGURE 48.—*Aegla prado*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

FIGURE 49.—*Aegla prado*, new species, male paratype: *a*, Dorsal view; *b*, merus of first right ambulatory leg. This specimen has a very prominently ridged carapace. The hands are less typical, the larger has perhaps been recently regenerated; likewise, the first left ambulatory leg is certainly relatively feebler than the other legs of this same specimen and lacks the ventral meral spines present on the first right ambulatory leg and both of the first pair of ambulatories of the type. *a*, natural size; *b*, twice natural size.

smaller spines) in line on the inner margin of the palm a little behind its anterior border; outer margin of hand somewhat small-spinulose, occasionally with a larger spinule or spine.

Anterior internal lobe or angle of carpus of cheliped forming a stout, acute, conical spine. Upper margin of merus with a straight, longitudinal row of sharp spines, no inward turn at anterior end as in *A. uruguayana;* anterior margin of merus scabrous or small denticulate. Ischium below on inner margin armed with a well-developed sharp spine at anterior end, a prominent feature even in quite small specimens; at posterior end a low conical tubercle or nodule, often with acute corneous tip (in only one of well-developed males was there a fairly sharp spine at the posterior end of the ischial border in addition to the much stronger spine at the anterior end).

The first ambulatory merus has a spine of fair size developed on the posterior ventral margin at about the level of the proximal margin of the articulating membrane, besides the smaller spine at the distal end of this same margin. With respect to this ventral meral spine, *A. prado* reveals kinship to *A. parana* and *A. sanlorenzo*, though quite different from them in a number of other respects, particularly in its smaller extraorbital sinuses, and therefore only moderately wide front.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite spined, anteroventral border almost straight to very slightly concave, ventral angle rounded off.

Sternal plate between chelipeds carries a median, corneous, spine-tipped, conical tubercle; even in very small specimens this sternal spine is of good size, well formed, and sharply acuminate.

Holotype.—One of the larger males of a sizeable lot of specimens, U.S.N.M. No. 80017, collected in a small tributary of the Arroyo Miguelete in the Prado, Montevideo, by the late Dr. Juan Tremoleras and myself, December 1, 1925. This specimen, the second largest male, is 25 mm. in length of carapace and rostrum taken together; the largest male, is 25.5 mm., the largest female 21 mm. long; included in the material are a considerable number of juveniles between 10 and 15 mm. long. These Aeglas were plentiful under the grass and vegetable debris that carpeted this very shallow stream, perhaps because of the numerous fragments of picnic lunch, bits of bread and meat scraps, that had been thrown into the water. The water temperature was between 28° and 29° C.

Remarks.—This species and *A. uruguayana* are much alike in general appearance, though very probably not in color in life. Most specimens of the latter that I have seen are very light colored in alcohol; *A. prado*, on the other hand, is quite dark, even the specimens that I collected 17 years ago.

The stepwise arrangement of the well-marked hepatic lobes and the frequently strongly ridged carapace tend to set this species apart from those that are most closely related to it. As in *A. uruguayana*, there is a sharp to spinous tipped tubercle on the anterior sternite, but in the present species it is larger, usually sharper, and more erect, forming roughly an angle of about 45° with the general surface of the sternite. The ventral inner ischial borders of the chelipeds are similarly armed in the two species, but in *A. prado* the posterior tubercle is more prominent, larger, higher, and more pointed, occasionally quite spinelike; in small specimens it is already sharp-pointed and readily hooks or engages a needle drawn backward along the ischial border; in small as well as large *A. uruguayana* posteriorly there is but a small low tuberclelike swelling or small nodulation which often is relatively inconspicuous.

Distribution.—*A. prado*, so far as at present known, has been found only in watercourses in and about the city of Montevideo. Dr. Florentino Felippone, long a valued correspondent of the United States National Museum, collected 2 males and 2 females of this species in the Miguelete on December 6, 1922, along with four smaller specimens of *A. platensis*. More recently, Alberto Tremoleras, son of the late Dr. Juan Tremoleras, of Montevideo, Uruguay, kindly collected for us a lot of 19 females in Arroyo Malvin, January 21, 1936, about 2 kilometers from its mouth. Of these, 16 were ovigerous specimens. He noted on the label, "fresh water, partly stagnant."

AEGLA CASTRO, new species

FIGURE 50; PLATE 26, F

Description.—A small species of which the largest specimen I have seen measures 28.5 mm. in length of carapace and rostrum together.

Carapace moderately convex. Rostrum an elongate, triangular, ridge-roofed spine, exceeding eyestalks by about 1½ times the length of the cornea; rostral carina well defined, furnished with about two rows of more or less alternating, often closely set, small, corneous scales; the rostral carina posteriorly merges with the general surface of the carapace on a level with the protogastric lobes.

Epigastric prominences somewhat rounded, blunt tuberclelike; anterior margin of protogastric lobes forms a conspicuous obtusely angled ridge or elevation which at its apex may be slightly scabrous.

Orbit wide, orbital spines well set off from anterolateral spines by a small to moderately wide extraorbital sinus.

Anterolateral spine of carapace fairly slender, reaching to middle of cornea or beyond. All three hepatic lobes usually plainly indi-

cated; only the first has its anterolateral angle spined, and forms an offset in the general trend of the anterolateral margin of the anterior portion of the carapace.

Large hand moderately inflated, somewhat elongated. Movable finger carries a well-formed, often small spiny lobe on outer margin near base. Palmar crest fairly large, conspicuous, somewhat subdisciform, distinctly shallowly impressed or excavate with upturned, more or less serrate, and definitely sharply spinulose margins; outer margin of hand finely spinulose.

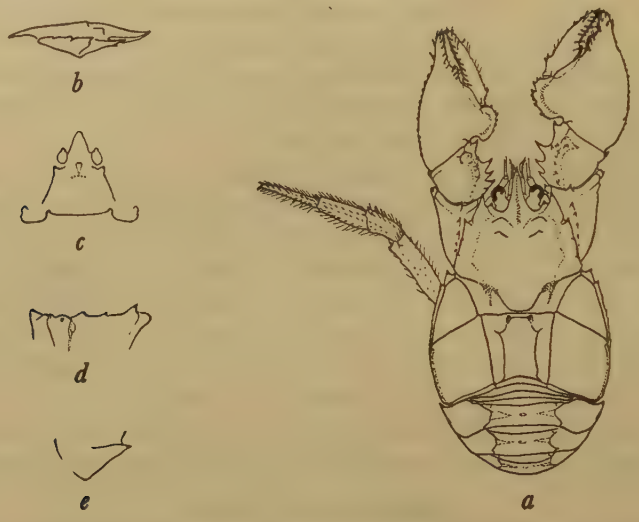

FIGURE 50.—*Aegla castro*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

Ridge above inner spined margin of carpus armed with conical tubercles, of which the greater part are more properly acute conical spines; the anterior internal lobe or angle of the carpus is broadly conical and tipped with a small sharp corneous spine; upper margin of merus armed with slender spines, of which the most anterior and sometimes the largest is situated directly on the anterior margin of the merus, the next spine may be slightly larger or slightly smaller than the anteriormost spine. Inner margin of ventral surface of ischium also has a strong conical spine at anterior end, and generally, in addition, a smaller one of variable size and acuity at the posterior end, and a much smaller one or two in between.

Meri of ambulatory legs with a small spinule or two near anterior end of lower outer margin on level with posterior portion of articular membrane or behind it, perhaps to some degree comparable to the similarly placed but relatively ever so much larger, conspicuous

spines in *A. parana* and *A. sanlorenzo*, and not quite so prominent one in *A. prado*.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite produced and well spined, anteroventral margin about straight; the ventral angle is rounded off.

Holotype.—The largest and best-developed male of a lot of nearly 200 specimens about equally divided between males and females taken from the Rio Iapó in the State of Paraná, Brazil, October 1925. The type, U.S.N.M. No. 80020, measures 28.5 mm. in length of carapace and rostrum.

Remarks.—The somewhat subdisciform palmar crest of this species is so strongly reminiscent of that of *A. odebrechtii* (p. 487) that when I first found this species in the field I thought I had found the species described by Fritz Müller, but the spined dorsal anterior epimeral angles of our species at once set it apart from his *odebrechtii*, in which these angles are rounded off and not spined. Moreover, the rostral carina and the spined carpal ridge of *A. castro* are very different. The palmar crest is also very similar to that of *A. odebrechtii paulensis*, from which, however, our species may be distinguished by the same characters that separate it from *A. odebrechtii*.

In the primarily 2-spined inner ischial margin the present species has something in common with *A. parana*, *sanlorenzo*, and *prado*, and also, as suggested above, in the armature of the ventral margin of the first ambulatory merus. In the first two of these species the posterior of the two ischial spines is about or nearly equal to the anterior one; the first and third species appear to have no intervening conical spines or nodules. On the other hand, in *A. castro* and in *A. sanlorenzo* there usually seems to be an intervening nodule, or small spine or two. In both *A. prado* and *castro* the posterior ischial spine, even if well developed, is noticeably smaller than, often only a fraction of the size of, the anterior one.

Color.—In life, a rather uniform very dark olive all over, with occasional suggestion of olive-green; suture lines a little muddy or grayish owing to dirt held there; antennae colored like carapace; antennules brownish gray, in part clay color. Prehensile margins of fingers of chelae dark orange-chrome, lighter below flushing the movable finger with color, with a bright spot at the articulation. Distal half of ambulatory dactyls saturn red to light orange-chrome suffusing the dark greenish basal half of the dactyls at the juncture of the two colors. Under parts generally dirty white, central portion of sternum sometimes with a faint touch of blue (?cerulean blue), under side of ambulatory propodi and carpi and outer margin of hands and maxillipeds dirty chromium green (for colors see Ridgway, 1886).

When turned over these specimens righted themselves very handily, a faculty not so apparent in the larger *parana* specimens collected at Rio Negro, Parana, Brazil. Small specimens would "freeze" when taken hold of by one leg, but not the larger individuals.

Distribution.—So far collected only in the general region about the town of Castró, Paraná, Brazil, chiefly in the Rio Iapó near the town, and for some distance up and down stream. In obtaining the considerable series of specimens I brought back with me, I was most helpfully assisted by the Harry Preston Midkiffs, of the Instituto Christão, by Camille Cunha and several of his nephews, and by Werner Nickol, Conrado Pusch, Amacleto Baptista, and a friend of theirs who took me on an all-day automobile trip to the Hacienda Marumby, where we obtained additional material. Air and water temperatures there were about 68° F. At Castró on October 20 at about 9:30 a. m. the air was 72° F., water 66° F.

AEGLA FRANCA, new species

FIGURE 51; PLATE 26, D

Aeglea laevis (especie duvidosa) LUEDERWALDT, Rev. Mus. Paulista, vol. 11, p. 431 (sep., p. 5), 1919.

Description.—A small species; the largest so far seen attains a length of carapace and rostrum together of 24 mm.

Carapace moderately convex, front relatively narrow. Rostrum moderately broad, ridge-roofed, lateral slopes of "roof" may be slightly concave; exceeds eyes by very little more than the length of the cornea; carinated to tip, carina furnished with a few irregular, fairly closely set rows of small corneous scales; posteriorly the dorsal margin or carina of the rostrum ends in a depression between and appreciably below the general level of the protogastric lobes of the carapace; front relatively narrow.

Epigastric prominences not at all well marked, obsolescent; anterior margins of protogastric lobes, on the other hand, are very prominent, acute angled, and almost tuberculiform apically (somewhat as in *A. prado*).

Orbital sinus of moderate size; orbital spine small and set close to anterolateral spine, making extraorbital sinus appear very small, more a small U-shaped notch than a sinus.

Anterolateral spine appears to be fairly short, yet it reaches at least to level of middle of cornea, often beyond. Anterolateral angle of first hepatic lobe acute, corneous-spine tipped, second and third lobes fairly well marked, scabrous or minutely spinulated, but not spined.

Large hand only moderately inflated, moderately broad. Movable finger has a small but definite spined lobe on outer margin near base.

Palmar crest low, narrow; obscurely and irregularly serrate, spinulose or small spined, margin very slightly upturned. Ridge on carpus of cheliped above spined, inner margin furnished with small, more or less transverse scabrous ridges; anterior internal lobe of carpus subacute with several spinules on its margins besides the small apical one; upper longitudinal margin of merus with a single row of sharp spines of which the first is much the longer; on the anterior margin of the joint in line with the upper marginal row of meral spines is a low scabrous tubercle. Inner margin of ischium beneath with a sharp conical spine at anterior end, another usually slightly smaller one near the posterior end, and one or two much smaller ones in the interval between the first two.

FIGURE 51.—*Aegla franca*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*-*e*, twice natural size.

Anterior dorsal angle of epimeron of second abdominal somite more or less blunt-angled; usually, but not always, with one or more tiny hyaline or corneous spinules or granules at apex of angle; anterior margin below angle about straight.

Holotype.—The largest of 10 males from Franca, State of São Paulo, Brazil, collected in October 1910, by E. Garbe (No. 622), received some years ago as a gift from the late Dr. Hermann von Ihering. The type, U.S.N.M. No. 80019, measures 24 mm. long (carapace and rostrum).

Remarks.—This species and the one following have relatively narrow fronts as compared with the several preceding species (A^1 section of diagnostic key). This character and the reduced extra-orbital sinuses are suggestive of the species that follow (A^2 section of key), yet, in general, the more or less ridge-roofed type of rostrum

and the fact that the rostral carina goes straight through to the tip of the rostrum seem to identify this species with the A^1 rather than the A^2 group.

In a measure, perhaps, *A. franca* and *A. jujuyana* are to be regarded as transition forms lying between those having a ridge-roofed rostrum and those in which the rostrum is longitudinally more or less troughed or excavate either side of the median carina.

Certainly *A. jujuyana*, next dealt with, is very closely related to *A. humachuaca*, with which it might have been grouped except for its sharply carinated rostrum, which for this reason appears to be more or less definitely ridge-roofed, as the broader, flatter, blunt-ridged rostrum of *A. humachuaca* decidedly is not. Moreover, the latter possesses a definite palmar crest of which there is no trace in *A. jujuyana*.

Distribution.—So far known only from the type locality.

AEGLA JUJUYANA, new species

FIGURE 52; PLATE 26, E

Description.—A species of moderate size, attaining a length of carapace and rostrum together of about 29 mm. Otherwise I have seen but two small specimens of 18 and 18.5 mm., respectively.

Carapace moderately convex. Rostrum fairly wide-triangular, scarcely exceeding eyes by the length of the cornea; median carina sharply crested to the anterior extremity, giving rostrum a definitely ridge-roofed appearance, particularly in the anterior half or third of its free portion, even though the lateral slopes of the dorsal surface of the rostrum toward the base of the rostrum are somewhat concave; rostral carina for whole or greater part of its extent with a single row of good-sized corneous scales, at least on that portion of the rostrum lying anterior to the posterior margins of the orbits; posteriorly the carina scarcely runs back to the anterior margin of the protogastric lobes; these are low, anteriorly blunt and scarcely marked except for the few corneous scales outlining them anteriorly. Epigastric prominences also low, scarcely better developed than the anterior margin of the protogastric lobes.

Orbital sinus of moderate width; orbital spine small, placed well up on inner margin or slope of anterolateral spine and set off from it by a small blunted-V-shaped sinus.

Anterolateral spines, though fairly short, appear moderately slender, reaching at least to middle of cornea or beyond. Anterolateral angle of first hepatic lobe acute and tipped with a small, sometimes acute corneous scale; second and third lobes indicated, somewhat scabrous, second usually a little better marked than the third.

Large hand short, stout, inflated, and smooth appearing; short fingers gaping, without the usual characteristic lobular tooth of an *Aegla* on prehensile margins (there is perhaps a very faint indication of an obsolescent lobular tooth on the movable finger of the minor chela); no lobe or trace of one on outer margin of movable finger near base; no trace of a ridge, however faint, on upper surface of palm. No palmar crest, dorsal margin of palm broad, thick and rounded off. Ridge on carpus of cheliped above spined inner margin

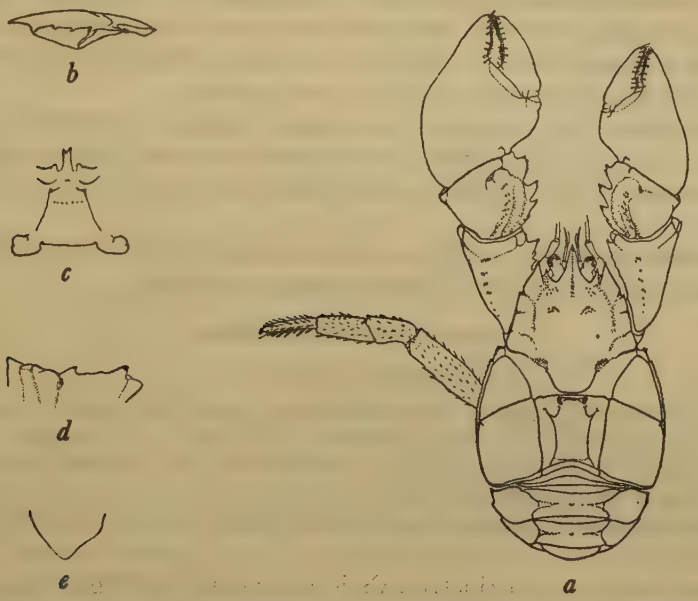

FIGURE 52.—*Aegla jujuyana*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

low and more or less obsolescent (it may be faintly traced for about two-thirds the length of the carpus), at most only slightly scabrous; anterior internal lobe of carpus subacute, flattened-conical, armed with two or three small corneous scales, of which the apical one is the larger; dorsal ridge of merus of cheliped furnished only with a longitudinal row of small, low, not very conspicuous, scabrous swellings; anterior margin merely slightly scabrous. Inner margin of ischium armed with two stout, low, conical, corneous scale-tipped tubercles, one anterior, one posterior; there may be one or two irregularities, obsolescent tubercles, or nodules on the inner margin between these spines.

First ambulatory legs with a small sharp spine or acutely pointed tubercle near anterior end of ventral margin of merus about opposite

the middle of the length of the articular membrane and a stouter low-conical one on inner side of ischium near "apex" of ventral face of this joint.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite may be blunt or rounded off, or armed with a tiny corneous spinule; the anterior margin below the anterior angle or spinule is very slightly concave. In the largest of three specimens, the male type, there is a definite small spine on the left side and none on the right; the other two specimens are quite small, the larger of these has a corneous spine on the right side and an almost imperceptible corneous scale or tiny granule on the left; the smaller has neither scale nor spine on either side.

Holotype.—The largest of three male specimens measuring about 29 mm. in length of carapace and rostrum together, collected by Antonio Pozzi and Angel Gatta, Rio Chico, Jujuy, 1925 (M.A.C.N. No. 16237).

Remarks.—See under *A. franca*, above, and *A. humahuaca*, below.

Distribution.—Known only from the type locality.

AEGLA DENTICULATA Nicolet

FIGURE 53; PLATE 26, C

Aeglea denticulata NICOLET, *in* Gay, Historia fisica y politica de Chile, Zool., vol. 3, p. 200, 1849; Atlas, Crustaceos, pl. 2, fig. 1, 1854.—GIRARD, Report of the U. S. Naval Astronomical Expedition to the Southern Hemisphere, vol. 2, p. 255, 1855 (listed only).

Aegla denticulata RATHBUN, Proc. U. S. Nat. Mus., vol. 38, p. 602, 1910 (listed only).

Description.—A distinctive, well-marked species of good size when fully grown, attaining a length of carapace and rostrum together of at least 31 mm. (based on the estimated length of a large specimen with broken rostrum); smallest specimen seen, also a male, 14.5 mm.

Carapace prominently and boldly, but bluntly, keeled for practically the full length of its median line, interrupted only by the cervical groove; carapace more ridge-roofed than convex; lateral margin of posterior portion of carapace behind cervical groove conspicuously serrate, first of these saw-teeth just behind cervical groove larger and broader than anterolateral tooth of carapace, second nearly equal to first; following teeth of lateral margin decreasing in size posteriorly to transverse suture line separating the anterior portion of the branchial region from the posterior; behind this suture line the margin is scarcely more than small denticulate, almost crenulate in appearance; the larger teeth or serrations of the lateral margin are often secondarily toothed or spined on their posterior borders. Front narrow. Rostrum moderately broad-triangular, scarcely if at all exceeding eyestalks by as much as the length of the cornea; an-

teriorly the median carina fades out in the distal third of free portion of rostrum, to become merged in the thickened tip of the rostrum; there is definite groove or depression either side of the medially raised portion of the rostrum and its somewhat thickened lateral margins; the rostral carina, though prominent, has a bluntly rounded-off crest on which there is a scattering of very fine, almost microscopic scabrosities. Epigastric prominences low, obsolescent, protogastric lobes equally poorly developed, causing scarcely more than a break in reflected light.

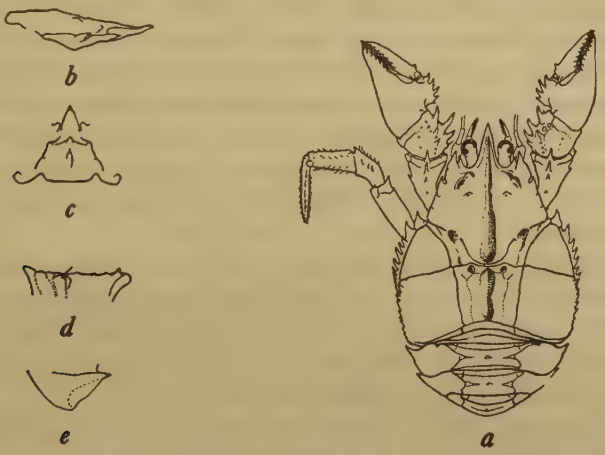

FIGURE 53.—*Aegla denticulata* Nicolet, male neotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size

Orbital sinus fairly narrow, an obtuse-angled V; orbital spine spiniform, rather high up on inner slope of anterolateral spine; extra-orbital sinus small, a narrow V-shaped notch. Anterolateral spines moderately slender-conical, sharply acute, reaching about to or a little past middle of cornea. Anterolateral angle of first hepatic lobe a stout, somewhat exserted spine; second and third lobes well marked by sizable notches, although their anterolateral angles are neither sharp nor particularly well developed, at most a little scabrous.

Hands, compared with most Aeglas, relatively feeble and underdeveloped, small and only lightly convex; prehensile margins of fingers fitting closely together; movable finger with a sharp spinous lobe on outer margin near base (in the largest specimen this lobe takes the form of a stout, sharply pointed, conical spine). Upper margin of palm forming a thick crest conspicuously spined, spines fairly slender and of good size, usually four spines; sometimes there is an additional smaller spine inserted near the base of one of the larger ones.

Ridge of carpus of cheliped above inner spined margin armed with four to five sharp spines, occasionally with a few very much smaller ones in between, sometimes, as in one of the females, these spines may not be fully developed, for they seem to be represented by scabrous-tipped tubercles; the spines arming the inner margin of the carpus are very prominent, long, very strong, particularly the more anterior, very sharp, and two in number not counting the almost equally strong spine, which appears to be more properly a part of the lobe at the upper anterointernal angle of the carpus; in advance of this particular spine the lobe carries a small, low, but sharp, conical, and relatively inconspicuous spine. Dorsal margin of merus of chelipeds armed at anterior end with a large, strong, sharply pointed spine, followed by perhaps two or three very much smaller ones; a spine similar to the large spine on the dorsal margin of the merus but of even larger size arms the anterior margin of the joint; often this spine has a little sharp spine or spinule on the inner or outer side of its base.

Inner margin of ventral surface of ischium with a very low, subacute, corneous-tipped cone at anterior end, scarcely developed enough to be called a spine, followed by three or four more or less equally spaced little bumps or small nodules which in some cases apically carry tiny, almost imperceptible, corneous scales.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite markedly produced, forming an acute corneous tipped spine which is strongly buttressed behind by a prominent ridge or carina; anterior lateral margin below approximately straight.

Neotype.—Second largest male measuring slightly over 27 mm. in length of carapace and rostrum, one of a lot of 10 ♂ 2 ♀ from Orsono, Chile, collected by the late Dr. C. H. Eigenmann, March 14, 1919 (U. S. N. M. No. 80021).

Remarks.—On the basis of the general character and appearance of the other species of *Aegla* described in this paper, Nicolet's original description and figure of *denticulata* scarcely appeared credible; the rather feeble hands led one to believe he had figured a female; the dorsal longitudinal keel or ridge running the full length of the carapace seemed an exaggeration; while the large prominent saw-teeth along the distal moiety of the lateral margin of the posterior portion of the carapace immediately behind the cervical groove gave the impression that they were a figment of the imagination. But after seeing the specimens of *A. denticulata* collected by Dr. Eigenmann, here redescribed, I am willing to believe that almost anything in the way of ornamentation and spining may be possible in the Aeglas.

Nicolet's apparently crude figure has proved to be a surprisingly

accurate portrayal of the salient characters in nearly every particular, including the sharply spined epimeral angle and the stout meral spines of the cheliped, as well as the row of spines on the carpus above the spined inner margin of this joint; only the middorsal row of scabrosities of the carpus are a little too prominent in his figure.

A. denticulata is virtually in a class or group apart from all other Aeglas; only *A. prado*, which I discovered and described before I came upon this *denticulata* material, at all approaches it, and then only in the keeling of its carapace in certain specimens, and also, to a slight degree, in the spining of the palmar crest and the inner margin of the carpus of the chelipeds.

Distribution.—As Nicolet says, "found in the republic" of Chile, but, so far as I know, the only specimens that have been seen since his time, 1849, are those from Osorno redescribed here.

AEGLA PAPUDO, new species

FIGURE 54; PLATE 27, C

Description.—A species of moderate size, attaining a length of carapace and rostrum of at least 26 mm.

Carapace very convex, perhaps more so than any other species of *Aegla*, especially across the gastric region. Rostrum more or less elongate-triangular yet along the middle of its length, in small part at least, with its lateral margins approximately subparallel; basally the rostrum is transversely fairly flattened and depressed either side of rostral carina; the rostrum has a strong downward trend, but its distal portion is markedly recurved; rostrum extends at least the length of the cornea or a little more in front of the eyestalk; either side of its median carina the rostrum is a little troughed or excavate; the carina extends forward only from one-half to not more than two-thirds the length of the free portion of the rostrum; beyond the anterior end of the carina the dorsal surface of the rostrum is generally for the most part gently concave from side to side and usually, but not always, without any but a slight trace of the carina or any corneous scaling in line with that on the carina itself; the corneous scales on the carina are very dark brown, thick, and almost beadlike; the carina runs posteriorly almost to the anterior margin of the protogastric lobes, its dorsal beading, however, extending back only to about halfway between the epigastric prominences and the anterior margins of the protogastric lobes; the carinal beading forms a single, virtually straight, at times slightly wavy row of scales.

The epigastric prominences are subacute-tubercular and topped with 2 to 6 beadlike scales like those on the rostral carina; one or two similar beads likewise mark the apices of the acute-angled an-

terior margins of the protogastric lobes. Areola wide, appearing very squat.

An orbital spine may be characteristic of this species; the evidence is not conclusive; the spine is often represented by a small spinule or acute corneous scale scarcely to be recognized as an orbital "spine"; about a third of the specimens examined, mostly small, had no spinule on either side, one-third had a definite spinule present on one or the other side, while the remaining third had a spinule or correspondingly sharp-pointed scale at the outer end of each orbit; whether

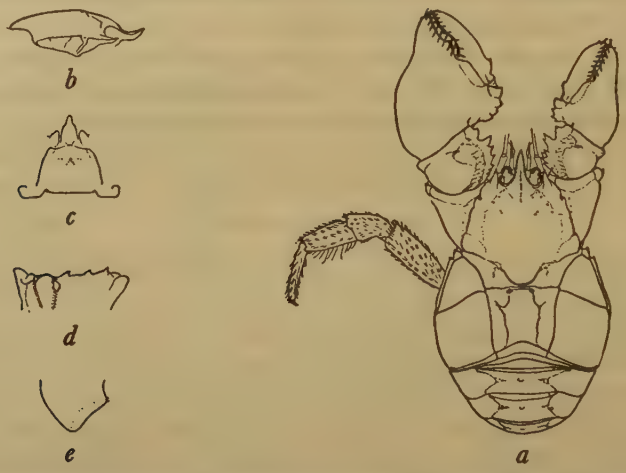

FIGURE 54.—*Aegla papudo*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size. The rostrum is more lingulate than is apparent in *a* (cf. pl. 27, C).

armed with a spinule, scale, or granule or not, there is nearly always a slight, sometimes abrupt but narrow, often lightly notched or incised offset, usually no wider than the thickened border of the orbit, between the outer end of the orbital margin and the inner slope or margin of the anterolateral spine. Each of the three specimens belonging to the Philadelphia Academy, referred to in the remarks appended to the "Distribution" of this species below, shows a definite though small orbital spine on each side, separated from the corresponding anterolateral spine by a narrow notch.

Anterolateral angle of carapace forming a sharply acute, fairly slender conical spine, which reaches to and a little past the posterior border of the cornea, in some cases about to the middle of the cornea.

Anterolateral angle of first hepatic lobe thick, lumpy, and blunted, with a few corneous, scalelike projections, scarcely to be called

spinules; second and third hepatic lobes evident, but poorly marked.

Large hand stubby, palm thick and heavy looking, much swollen, almost subglobular in appearance in some specimens, scabrous. Movable finger with a low swelling or rather a small, more or less obsolescent spinulose lobe on outer margin near base. Palmar crest low, outer margin thick and blunt-tubercular; the almost tuberclelike serrations are furnished with short, more or less transverse rows of small, pointed, corneous scales, few in number. Carpus rough-scabrous, the only longitudinal ridge being the one above the inner marginal row of spines; this ridge appears doubled, as it carries two longitudinal series of more or less transverse rows of small, pointed, almost spinulelike corneous scales. Anterior internal lobe or angle of carpus, though at times subacute, more usually blunt, generally furnished with several scattered, more or less subequal, almost spinuliform, corneous scales; occasionally the apical one is a little larger than the others. Merus armed above with a longitudinal series of blunt tubercles topped with one, two, three, or more small, pointed, corneous scales; anterior margin fine denticulate, without lobe or swelling. Inner margin of ventral surface of ischium armed with three to four more or less subequal, more or less equispaced, low, but definite and well formed, conical tubercles or spines with subacute to acute corneous tips, one anterior, one posterior, and one or two in the interspace between the first two.

Dorsal anterior angle of epimeron of second abdominal somite normally and usually rounded off and unarmed; very rarely does one find a corneous scale or denticle or two, or even a small spinule here and there usually on the epimeron of one side only. The specimen selected as the type is, in this respect only, perhaps one of the most atypical specimens in the entire type lot. It is the largest specimen and has two little scales or tiny denticles on the right epimeron and one tiny "cornule" on the left; the next largest specimen has nothing of the sort on either dorsal epimeral angle; otherwise, only four specimens out of the original lot of 20 have any trace of spinule, denticle, or scale on the right or left epimeron. In about its middle third the sternite between the bases of the chelipeds of the type and one other specimen is somewhat swollen or raised up along the median line, more so anteriorly, where it carries a perhaps adventitious, tiny, corneous prickle or spinule, than posteriorly. In the next largest specimen this swelling is much less marked. Also, it is unarmed, as it is in the rest of the specimens at hand. Most of these have the median elevation more or less obsolescent, yet have an appreciable, though not very noticeable, convexity of the underside of the sternite; in a few of the smaller specimens it is not evident at all.

Holotype.—The largest male out of a lot of 14 males and 6 females (1 ovig.), measuring 26 mm. in length of carapace and rostrum, collected by J. A. Wolfsohn at Papudo, Chile, and received at the Field Museum on February 3, 1925 (Field Museum No. 2285; paratypes, 2286).

Remarks.—This species, because of its very strongly reflexed, anteriorly concave, or excavated rostrum, very convex carapace, and much-swollen hands with low thick palmar crest, stands quite apart from the other species of *Aegla.*

Although the dorsal anterior angle of the epimeron of the second abdominal somite may rarely, and I believe only adventitiously, carry a small, corneous scale or two, or even a tiny spinule, it does seem that *A. papudo* is properly one of the group of species with a rounded, unarmed dorsal anterior epimeral angle which includes *A. odebrechtii*, *A. o. paulensis*, *A. neuquensis*, and *A. affinis.* In certain other respects *A. papudo* seems to stand not far from *A. concepcionensis.*

The several suture lines that meet to form the anterolateral angles of the cardiac area of the carapace combine to form a short, quite longitudinally oriented bar (fig. 54). It holds for every specimen of *A. papudo.* Otherwise, I have noticed this state of affairs only in the unique holotype of *A. affinis* (p. 496, fig. 58, *a*). In all other species this short "bar" is, in contrast to *A. papudo* and *A. affinis*, oriented so as to be very nearly transverse, or at least obliquely transverse.

Distribution.—So far known only from the 20 specimens (14 males, 6 females) of the type lot from Papudo, Chile; 3 males and 1 female from Talcahuano, Chile (M. C. Z. No. 10480) and 1 male (about 24 mm. long) with only the indication Chile on the label, belonging to the Museu Paulista, São Paulo, Brazil (M. P. No. 1306). I have also seen a not altogether satisfactorily determinable female specimen from the Rio Mapocho, near Talaganti, Province of Santiago, Chile, collected by my good friend Dr. Carlos E. Porter, March 17, 1940, that seems to be this species.

Recently I had the opportunity of examining the Aeglas belonging to the Academy of Natural Sciences of Philadelphia. Included in that collection were three dried female specimens between 30 and 31 mm. in length of carapace and rostrum together, labeled "*Aeglea laevis*, Chili, Dr. Wilson" (Acad. Nat. Sci. Phila., no. 484, pt.). All showed the more or less longitudinal suture lines of *A. papudo* (and *A. affinis*). Their anterior dorsal epimeral angles are rounded off and show no trace of either corneous scale or spinule. The rostral carina seems a little more prominent for a greater extent of the rostrum than is the case in most of the representatives of the species I have seen so far, the carina having perhaps become accentuated as a result of

the drying out of the specimens. Orbital spines, separated from the anterolateral spines by narrow notches or incisions, are definitely present. The palmar crest is typical, low and appearing lumpy.

AEGLA ODEBRECHTII Müller

FIGURE 55; PLATE 27, A

Aeglea Odebrechtii FRITZ MÜLLER, Jen. Zeitschr. Naturw., vol. 10 (new ser., vol. 3), p. 13, pl. 1, figs. 1–10, 1876.

Aeglea intermedia MOREIRA, Arch. Mus. Nac. Rio de Janeiro, vol. 11, pp. 21, 84, 1901.

Description.—A species of moderate size, attaining at least 28 mm. in length of carapace and rostrum taken together.

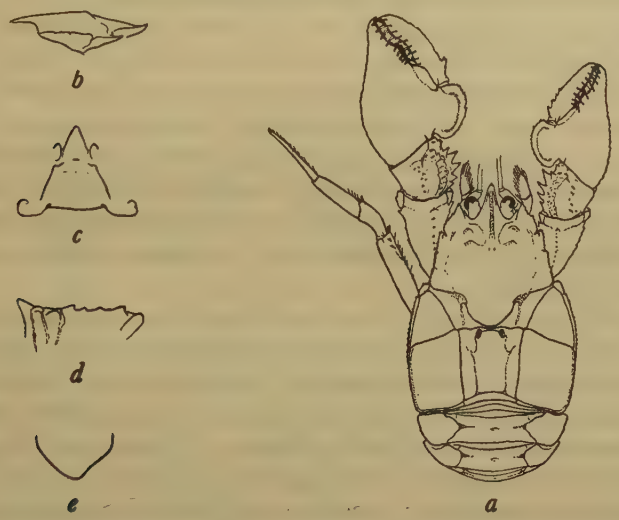

FIGURE 55.—*Aegla odebrechtii* Müller, male neotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

Carapace with gastric region quite convex. Rostrum relatively short, not exceeding eyes by more than the length of the cornea, fairly flat, broadly triangular, and appreciably widely grooved or excavate either side of the well-marked median carina; distally the carina tends to fade out before reaching the anterior extremity of the rostrum; on the carina are two rows of small, more or less alternating, corneous scales fairly close together, so much so that close to the distal end of the carina the two rows merge to form one irregular row.

Protogastric lobes not well marked, because of the very appreciable convexity of the gastric region; epigastric prominences blunt swellings.

Orbital sinus moderately wide but shallow, orbital spine a small, acute, corneous projection set close to the anterolateral spine and separated from it by a much-reduced extraorbital sinus, a small V-shaped incision or notch. Anterolateral spine relatively short, flattened triangular in the largest specimen, more slender and elongate appearing in the smaller ones, may reach a little past the level of the posterior margin of the cornea.

First hepatic lobe, though separated from the anterolateral one by a conspicuous notch, has its anterolateral angle bluntly rounded off and its lateral margin small scabrous, as are the margins of the second and third hepatic lobes, which are only poorly indicated; in smaller specimens the first hepatic lobe is subacute and tipped with a corneous scale larger than those elsewhere on the lateral margin.

Hands broadly ovate, more or less flattened, yet gently convex. Movable finger with a definite lobe on the outer margin near the base; lobe tipped or furnished with one or more acutely conical corneous scales (almost very small, short, conical, corneous spines). Palmar crest the most distinctive feature of this species, large, subdisciform, and noticeably excavate, much as if it had been impressed or pinched out while soft with the ball of one's thumb; margin of crest noticeably upturned, more or less obscurely serrate, scabrous to small-spinulose.

Ridge of carpus of cheliped above spined inner margin well developed, raised above general level of carpus, and marked with nodular swellings carrying transverse rows of corneous scales; anterior internal lobe or angle of carpus low, conical, and furnished with small corneous scales apically and on its slopes. If one regards the largest spine of those arming the inner margin of the carpus as the most anterior of that particular series, we find then in this species on the inner anterior slope of the base of that first spine a smaller, yet conspicuous, strong spine located in more or less of a triangular area delimited by that first spine, the carpal ridge, and the anterior internal lobe of the carpus. This "inserted" spine may sometimes be closer to, but not normally fused with, the large first spine of the series arming the inner margin of the carpus than it is to either the carpal lobe or the carpal ridge. This spine seems to be represented in the closely related *A. odebrechtii paulensis*, immediately following, by a similar one also placed on the anterior slope of the first spine of the series arming the inner carpal margin; unlike the independent, distinct spine of the species proper (*s. s.*), it is always much fused with the first spine (of the inner marginal series), so that usually only its tip is distinguishable; sometimes it is wholly fused with the first spine, which, in either case, is a very much thickened spine. In *A. odebrechtii*, between the "inserted" spine as it may be designated and

the carpal ridge there may be, also in the larger specimens of the species, an acute little tubercle armed apically with two or three sharp, dark-colored corneous scales. Inner margin of ventral surface of ischium armed with four more or less subequal, at times more or less equispaced, low, but definite and well-formed, conical tubercles or spines with subacute to acute corneous tips, the anteriormost the largest, the most posterior second in size, the anterior of the two in between the first two named, third, and the posterior fourth in size (this describes the margin of the left ischium of the neotype; the right is armed like the left except that the two spines in the interspace between the anterior and posterior spines are just about equal in size and placed quite close together in the middle of the interspace); in the specimen next in size (25 mm.) the anterior spine is quite appreciably larger than any of the others on this margin of the ischium.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite broadly rounded off, not spined.

Neotype.—The largest male I have seen (U.S.N.M. No. 80022), 28 mm. in length of carapace and rostrum, was collected by Dr. Carlos Moreira in 1904 in Santa Catharina, Brazil, and later generously presented by him to the United States National Museum.

Remarks.—More intuitively than he realized, Fritz Müller (1876) exclaimed, when his first specimen of *Aegla odebrechtii* came to hand, "How is it that we find this Pacific crustacean [from the western slopes of the Andes] in our mountains [here on the Atlantic coast of Brazil]?" So far as he knew at that time, no representative of the genus had been discovered outside of Chile, and, in spite of the wide distribution of the Aeglas here described, his species is the one east South American form that seems most to resemble those inhabiting the slopes of the Andes.

Distribution.—Aside from the neotype, I have seen just 8 other specimens, 6 males, of which the largest measured 25 mm. in length of carapace and rostrum, the next in size 14, and the smallest 13½ mm., and 2 females of 15 and 14 mm., respectively. These specimens were kindly obtained for me by Dr. Carlos Moreira through the kind offices of his good friend Dr. G. Kuhlmann, Blumenau, Santa Catharina, Brazil. I am very grateful to both of these estimable gentlemen for their interest and help in this matter.

An additional, quite typical male belonging to the Academy of Natural Sciences of Philadelphia (no. 484, pt.), 26 mm. long, carapace including rostrum, and labeled "du Brésil. Donni par M. M. Derreaux," has lately come to my attention. It has the characteristic "inserted" spine easily observable in the neotype (fig. 55, *a*, and pl. 27, A); the ventral inner margin of the ischium of the right cheliped is likewise armed as in this figured specimen.

AEGLA ODEBRECHTII PAULENSIS, new subspecies

FIGURE 56; PLATE 27, B

Aeglea intermedia LUEDERWALDT, Rev. Mus. Paulista, vol. 11, p. 431 (sep., p. 5), 1919.

Description.—Perhaps only a small species; my material of this form is limited; the largest specimen at hand, a male, in length of carapace and rostrum together measures 20 mm.; the male holotype is just 1 mm. shorter.

Carapace moderately convex, front of moderate width. Rostrum broad and somewhat stubbily triangular; bluntly carinated nearly to the anterior extremity, noticeably troughed or excavate either side of carina, which broadens out and becomes more or less lost in the general surface of the carapace at a level about halfway between the level of the epigastric prominences and the anterior borders of the protogastric lobes, these last take the form of a low, somewhat arcuate, blunt elevation or obsolescent ridge; the epigastric prominences are fairly well developed and nodular or near rounded-tubercular.

Orbital sinus moderately wide, only moderately deep, fairly deep as compared to *A. odebrechtii;* orbital spine small; extraorbital sinus is quite shallow and, though small, is relatively moderately wide as compared with *A. odebrechtii.*

Anterolateral spines small, stubby, and only moderately advanced beyond the orbital spines (in some apparently more or less worn individuals the orbital spines are nearly on a level with anterolateral ones). First hepatic lobe set off from anterolateral lobe by a fairly wide, relatively good-sized notch; anterolateral angle of the first hepatic lobes a little produced and subacute, carrying a small corneous granule or denticle, lateral margin of lobe scabrous; second and third hepatic lobes, though not much more so, are a little better marked than in *A. odebrechtii.*

Large hand relatively of good size, broadly oval, stockily built, with palm rather thick and swollen toward outer margin. Movable finger with a small, definite, though not particularly conspicuous, scabrous lobe on outer margin near base.

Inner margin of palm with a well-developed, impressed or excavate crest, having its outer margin somewhat parallel to the dorsal margin of the palm proper, not nearly so subdisciform as in *A. odebrechtii;* margin of this palmar crest more or less definitely serrate, serrations marginally scabrous or fine denticulate or corneous granuled, perhaps even small spinulate at or on apices of serrations.

Ridge of carpus of cheliped above spined inner margin more or less well developed, scabrous-nodular; large anterior spine of series arming inner margin of carpus may be as large and thick as if it

were formed by the merging of two spines of normal size to form one; usually most traces of the double nature of this large anterior spine are lost except as evidenced by its noticeable breadth as in the case of the spine on the right carpus of the type, which is only most obscurely 2-pointed; nevertheless, there are instances, as on the left carpus of the type, that reveal very clearly the double nature of this thickened first spine with a distinctly twinned or 2-spined extremity; in the interval between the base of this thickened first spine, the base of the carpal lobe, and the anterior portion of the carpal ridge,

FIGURE 56.—*Aegla odebrechtii paulensis*, new subspecies, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

there may be two or three very small, slightly tubercular scabrosities; the carpal lobe itself is scabrous, bluntly rounded to subacute. Upper longitudinal margin of merus armed with at least two strong spines of good size followed by several smaller ones; in advance of the anteriormost, the largest spine, on the actual anterior margin of the merus is a low, lobular, subrectangular ridge, longitudinally oriented. Armature of the inner margin of the ventral surface of the ischium very like that of *A. odebrechtii*, a fair-sized, stout, conical spine at anterior end with usually two subequal, somewhat smaller ones close together at posterior end, often a fourth still smaller spine in the interval between the posterior pair and the anterior spine; only exceptionally is there only an anterior and one posterior spine or only one intervening one (as in fig. 56, *d*).

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite in general more or less rounded off, as in *A. odebrechtii*.

Holotype.—The next to largest male, U.S.N.M. No. 80023, of a lot of 4 males and 3 females collected by Dr. Doris M. Cochran at Alto

da Serra do Cubatão, between Santos and São Paulo, Brazil, April 26, 1935.

Remarks.—Although this subspecies is decidedly similar to *A. odebrechtii* Fritz Müller, I do not have at hand enough well-developed specimens to prove either their specific distinctness or identity. Therefore the specimens I do have have been given subspecific ranking.

In relation to the eye, the rostrum of the species proper appears a little longer; also it seems to be relatively a little more recurved distally; the rostrum is more nearly straight in the subspecies. The orbits of the subspecies are definitely wider than in the species proper and represent perhaps the most noticeable difference between the two forms. Though not affording a very clear-cut difference, the anterolateral spines seem a little longer in the species proper, appearing to reach a little past the posterior margin of the cornea, while in the subspecies the anterolateral spine scarcely reaches the cornea. The anterior margins of the protogastric lobes are definitely elevated in the subspecies and the epigastric prominences, though low, are conspicuously tuberculiform; the reverse is true in the species proper on both counts.

Next to the orbits, the chelae of the two forms seem to be most definitely different. In the subspecies they are relatively heavier, stouter (chunkier, more swollen, or inflated), with appreciably shorter, broader (stubbier) fixed fingers; the outer margin of the palm of either hand has a comparatively greater convexity; while the palmar crest is generally more (more or less) subparallel-sided trough-shaped than impressed or excavate-subdisciform, and certainly more definitely serrate in nearly every specimen of the subspecies than in the species proper.

Ordinarily, the female Aeglas do not exhibit the pronounced asymmetry found in the male major and minor chelae, but in this subspecies at least there is such asymmetry that at first glance the two females with both chelae present (of the three females seen) were taken to be males.

It is possible that I have set up one form too many in naming this subspecies.

Distribution.—Other than the specimens from the type locality, I have seen only a few small individuals, of which the largest was about 15.5 mm. in length of carapace and rostrum together, which may represent this subspecies, but I do not feel that I can make more than tentative determinations of small specimens of forms as closely related as the two here designated as *A. odebrechtii* and *A. o. paulensis.* One lot of four small specimens received from Dr. Hermann von Ihering a number of years ago is from the "Rio Juquery, Perus,

Estado São Paulo"; another small female, also from Dr. von Ihering, is labeled simply Alto da Serra, São Paulo (Coll. J. Lima, 1908). A third lot of seven small specimens collected by E. Garbe, from Castro, Est. Paraná, is even more of a puzzle than either of the preceding lots; the rostra do not seem to be quite typical of *paulensis*, yet the specimens cannot be identified with the species *A. castro*, which I found so common in the Rio Iapó at Castro, for their unarmed dorsal epimeral angle precludes the possibility; even much smaller Castro specimens of my own collecting have this angle unmistakably spined.

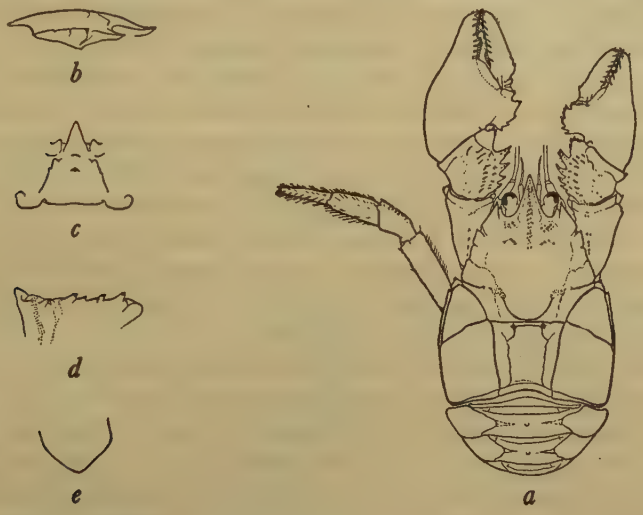

FIGURE 57.—*Aegla neuquensis*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

AEGLA NEUQUENSIS, new species

FIGURE 57; PLATE 27, E

Description.—A species of moderately to fairly large size, exceeding a length of carapace and rostrum together of at least 30 mm. (based on the largest specimen seen, a "soft" male with regenerated but not yet fully developed rostrum).

Carapace moderately convex, front moderate; rostrum flattened triangular and deeply grooved or excavate either side of median carina, which tends to fade out toward tip of rostrum which is appreciably reflexed or upturned; rostrum exceeds the eyestalks from about 1½ (in the type) to about 2 times the length of the cornea; the rostral carina is furnished with a more or less double row (on

occasion in places apparently three rows) of closely set corneous scales for at least half the length of the free portion of the rostrum, beyond the midpoint there is but a single row of the scales, which, like the carina, tends to fade out or disappear before reaching the distal extremity of the rostrum (sometimes there is an odd grouping of a few scales on the dorsum of the extreme tip of the rostrum); the rostral carina is plainly marked backward to the level of the anterior margins of the protogastric lobes, and in at least the larger of the specimens at hand, faintly to be seen if only as an interruption to reflected light halfway back to the cervical groove.

Protogastric lobes poorly indicated; epigastric prominences not very prominent, obliquely elongated, scabrous swellings.

Orbital sinus moderately wide, in dorsal view appearing not much wider than deep; orbital spine always present, small but well formed; extraorbital sinus narrow, a V-shaped notch. Anterolateral spines relatively small, yet reaching past posterior border of cornea often about or nearly to middle of its length. Anterolateral angle of first hepatic lobe produced but not spined, though scabrous or small spinulated as on lateral margin of lobe; second and third lobes no more than plainly indicated by shallow emarginations in lateral margin of anterior portion of carapace.

Asymmetry of hands not very pronounced; large hand of moderate size, more or less subovoid, only moderately inflated; the hands are coarsely scabrous, almost tuberculated. Movable finger in the type does not seem to have a real lobe developed on outer margin near base, yet there are a few larger spinules on a very slight elevation at the site of the lobe found in other species; however, in other specimens smaller than the type a slight lobe armed with several sharp spinules seems definitely present. Palmar crest more or less narrowly subrectangular, fairly thin-edged, serrate or notched, and spinulose; dorsal surface of crest at most only very slightly concave, margin of crest not noticeably or appreciably, if at all, bent upward.

Ridge of carpus above spined inner margin carrying practically a double row of scabrous elevations; between anterior spine, the largest of the series arming the inner margin of the carpus, and the carpal ridge there is a short, acute, conical spine nearly subequal in elevation with the scabrosities of the carpal ridge (this spine seems to be present in the specimens from the type locality, Arroyo, but not at all, or only almost imperceptibly indicated in the specimens from Covunco); anterior internal lobe or angle of carpus flattened-conical, or triangular, armed with one larger, sharp-pointed corneous denticle, with a smaller one close behind on the posterior slope, and usually one or more still smaller spiniform scales. Upper longitudinal margin of merus of cheliped with a series of small, more or

less subequal scabrous tubercles, except the first which is quite the largest; anterior margin of joint medially produced, forming a denticulated lobe; these denticulations are usually carried outward along the anterior margin of the merus, scarcely ever and perhaps only adventitiously along anterior margin inside the lobe itself. Inner margin of ventral surface of ischium armed with from four to six conical corneous-tipped tubercles or spines, of which the most anterior and posterior are more or less subequal and the largest; often the first spine is twinned (the twin being smaller and on the posterior slope of the anterior spine proper and included in the four to six count); more rarely is the posterior, or one of the intermediate and always smaller spines twinned (as in left ischium of type, fig. 57, *d*).

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite evenly rounded off, anterior margin below angle straight.

Sternite between bases of chelipeds with anterolateral angles produced, tuberculiform; on median line near anterior margin of this sternite there is a low conical elevation topped by a small, usually acute corneous spinule.

Holotype.—The second largest male, U.S.N.M. No. 80024, of a lot of 4 males and 1 female, measures 29 mm. in length of carapace and rostrum; the female measures 20.5 mm.; the smallest male, 17.5. All were collected at Arroyo, Territory of Neuquen, Argentina, by John W. Titcomb, November 12, 1903, while conducting a fisheries survey in that vicinity for the Argentine Government.

Remarks.—This species is certainly closely related to the following, yet differs from it in several important points. The separate description of the latter seems fully warranted.

Distribution.—In addition to the type lot, I have examined a second lot of material, 5 males and 1 female, ranging from 18 to 24 mm. in length of carapace and rostrum together. These specimens were collected the same day as the type lot, November 12, 1903, by Mr. Titcomb at Covunco [?] or in the [Rio] Covunco; the original label is somewhat rubbed and partly illegible, but the date and "Neuquen" [Territory ?] are unmistakable.

AEGLA AFFINIS, new species

FIGURE 58; PLATE 27, F

Description.—I have seen but one specimen of this species, the unique holotype, a male of fairly large size, measuring in length of carapace and rostrum 31 mm. Most of its legs are broken, and the chelipeds are detached; in addition there is another loose cheliped of a specimen of probably the same size.

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In general appearance it is much like *A. neuquensis;* carapace and rostrum very similar, but front seemingly narrower, extraorbital sinuses and orbital spines wanting. Rostrum exceeds eyes by not quite twice the length of cornea; the blunt carina more or less continued to distal extremity, more nearly approaching the ridge-roofed condition of rostrum than any of the Aeglas of the A^2 division of the diagnostic key; the rostrum otherwise appears quite flat, particularly basally, and fairly well troughed or excavate either side of median carina; the latter is bluntly rounded off and scabrous, with rather numerous, closely set, partly imbricate-appearing corneous

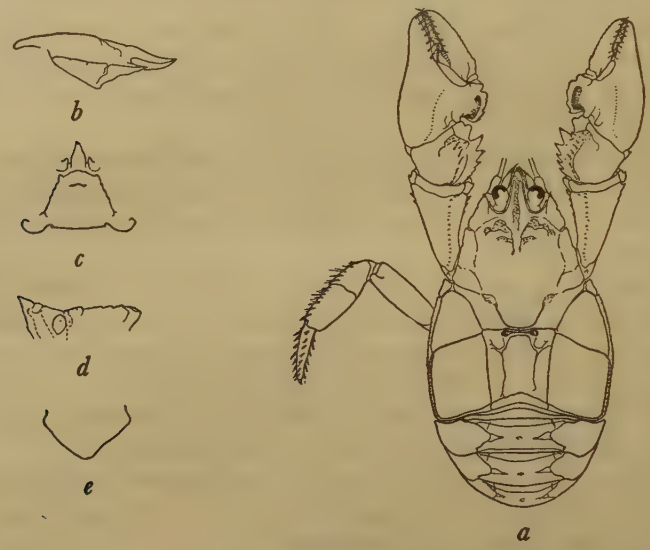

FIGURE 58.—*Aegla affinis*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

scales not at all arranged in rows as in *A. neuquensis*; rostral carina most imperceptibly if at all suggested posterior to obsolescent anterior marginal indications of protogastric lobes.

Anterolateral spines flattened-triangular in dorsal view, reaching on the left side nearly to middle of cornea, on right well past middle of cornea; anterolateral angle of first hepatic lobe somewhat produced, subacute or rounded off, small spinulose or scabrous; second and third lobes poorly, obsolescently indicated.

Hands more elongate-subrectangular than subovoid as in *A. neuquensis*, and more coarsely scabrous. Movable finger seems to be without trace of lobe on outer margin near base, except on minor chela, where there is a very small corneous spinule or denticle larger

than the scabrosities of the surface of the finger otherwise in the position normally occupied by the lobe in other species. (Having so little material, it is impossible to tell whether the lobe is in evidence in small individuals of the species. There is no trace of it on the movable finger of the loose cheliped.) Palmar crest more or less subrectangular, thicker appearing than in *A. neuquensis* and certainly with thicker, blunter, obscurely crenulate, coarsely scabrous margin; dorsal surface of crest decidedly more concave (more or less longitudinally troughed) than in *A. neuquensis*, but without giving the margin of the crest any noticeable bent-up appearance. Carpal ridge fairly broad and blunt, more or less obscurely scabrous, and only obscurely double-rowed as in *A. neuquensis*; spines of inner margin of carpus thickened and scabrous, between anterior spine (very much the largest and stoutest of this inner marginal series) and the carpal ridge is a tuberculiform, scabrous elevation corresponding to the similarly placed spine in typical *A. neuquensis;* lobe at anterior inner angle of carpus quite rounded off in general outline, margined with small, denticuliform, corneous scales. Upper longitudinal margin of merus of cheliped armed with a series of small scabrous tubercles; this row or series at its anterior end makes practically a right-angled bend one or two tubercles long, toward the inside, more or less paralleling anterior margin proper of joint[17]; this is very evident in the meri of the type but not in the additional loose claw (No. 4186) of this species. No indication, or scarcely any, of this state of affairs exists in *A. neuquensis;* there may be a bare suggestion of it in some specimens in which a tiny, well nigh microscopic corneous scale or prickle may appear on the inner side of the anterior spine or tubercle of the upper longitudinal margin of the merus of the cheliped. The anterior margin of the merus of *A. affinis*, though scabrous or fine denticulate, shows no median lobular development as is present in *A. neuquensis.*

Inner margin of ventral surface of ischium armed much as in *A. neuquensis*, only cones are smaller, mostly blunter, and on the whole more nearly subequal throughout, four on right ischium, six on left, because of a twinning of the posterior spine, and also the one just anterior to it.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite rounded off; anterior margin below angle straight, or very slightly concave.

Anterolateral angles of sternite between bases of chelipeds produced, tuberculiform; on median line near anterior margin a low swelling, but with no trace of a corneous spine or denticle arming it.

[17] A similar condition is found in *A. uruguayana*, p. 467.

Holotype.—A single male carrying M.A.C.N. tag No. 9817, contained in a bottle with an unattached left cheliped surely the same species with an M.A.C.N. tag, No. 4186, affixed, together with a specimen of each of two other species without tags. Of these last, one is a female of *A. humahuaca*, 22.0 mm. in length of carapace and rostrum together, the other a male of *A. abtao*, of 28.0 mm. In the catalogs of the Museo Argentino Ciencias Naturales entry No. 4186 reads simply, "Neuquen, Mayo 16, 1898; Sr. Carlos Burmeister"; entry No. 9817 concerns specimens of *Mytilus chorus* Molina received in exchange from Dr. Carlos S. Reed, 21–V, 1919. As a result, it is impossible to determine satisfactorily the type locality for the species, and there is no locality at all for the other, untagged, specimens in the same bottle. It is a mixed lot of material, or else a case of misattached label or labels.

Remarks.—As pointed out under *A. papudo* above, this is the only other species in which the several suture lines that meet to form the anterolateral angles of the cardiac area of the carapace combine to form a short, quite longitudinally oriented bar (fig. 58). In all other species except these two this short "bar" is oriented so as to be very nearly transverse, or at least obliquely so.

AEGLA HUMAHUACA, new species

FIGURE 59; PLATE 27, D

Description.—A species of moderate size. The largest of five specimens seen measures about 28 mm. in length of carapace and rostrum taken together.

Carapace moderately convex, front relatively narrow. Rostrum rather thick looking, proximally more or less broadly flattened-triangular, noticeably depressed anteriorly, bent downward, so much so that in lateral view the rostral extremity is about on or even slightly below the level of the anterolateral spines; distally the rostrum becomes somewhat lingulate, slightly parallel sided, low, and broadly blunt-ridged, scarcely to be called carinated; only very shallowly excavate either side of median carina; carina marked in basal half with three or four very irregularly intermingled rows of corneous scales, becoming distally more or less a single scattered row, which near tip of rostrum tends to disappear, scarcely or not distinguishable from the few scattered corneous scales on the dorsum of the apical portion of the rostrum. Epigastric prominences and anterior margins of protogastric lobes poorly developed.

Orbital sinus fairly narrow, more or less V-shaped; orbital spine small, placed well up on inner slope or margin of anterolateral spine and separated from it by only a small notch. Anterolateral spine relatively small, short, and flattened-conical. Anterolateral

angle of first hepatic lobe low, scabrous-tubercular; second and third lobes very poorly marked.

Hands large, oval, moderately inflated, and without usual lobular tooth on prehensile margin of immovable finger; movable finger likewise without such a tooth; there is no lobe on the outer margin of the movable finger, and the palmar crest, though not prominent, is distinctly present, thick, low, and in cross section broadly triangular; dorsal surface of crest faintly, shallowly, or more or less obscurely excavate; the crest is scabrous with an outline that is more slightly irregular than obscurely serrate; serrations may be spinule tipped.

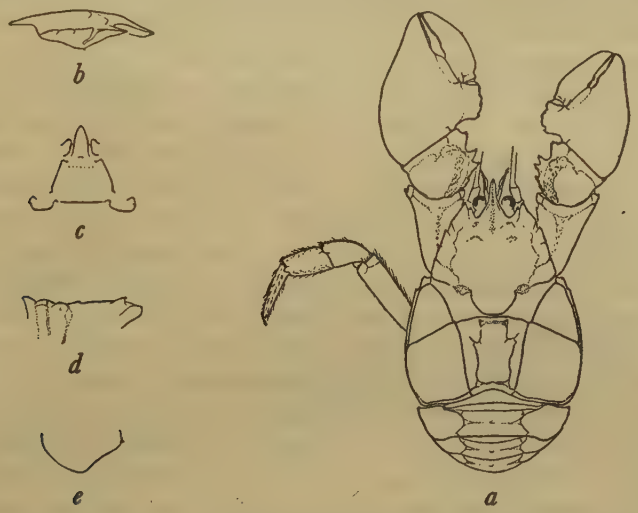

FIGURE 59.—*Aegla humahuaca*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

Ridge of carpus of cheliped above inner spined margin not very prominent, low and broad and in small part only slightly scabrous; the armature of the inner margin of the carpus is not so definitely spinelike as in most other Aeglas; here it consists more of spinelike tubercles, perhaps only the most anterior of the series may be so designated, as the next three or four are more or less tuberclelike in appearance; the posterior one or two of these are indeed very low, blunt, and scabrous; anterior internal lobe or angle of carpus scarcely more than obtuse angled; this angle is armed with one or more small, low-conical but more or less sharp-pointed corneous scales; upper longitudinal margin of merus blunt angled, hardly more than a scabrous ridge marked or armed with a row of fairly well separated, short, subacute, corneous scales; the anterior margin of the merus is finely denticulate, but no lobe or forwardly directed projection

is developed there. Inner margin of ventral surface of ischium with an anteriorly corneous spine- or pointed-scale-tipped tubercle at anterior end, and a lower, likewise corneous spine-tipped tubercle at posterior end; two slight, at times almost imperceptible undulations, or slight low swellings, may occupy the interspace.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite rounded off, yet armed on its anterior margin, to the right, with two corneous spinules or denticles set quite close together, to the left with one.

Holotype.—The largest of four males from Humahuaca, Jujuy, Argentina (M. A. C. N. No. 8837) measuring about 28 mm. in length of carapace and rostrum together; the other three males of the type lot measure respectively 25.0, 24.5, and 17.5 mm.

Remarks.—This species and *A. jujuyana* so resemble each other in general appearance that one cannot escape the conviction that they may be very closely related in spite of the fact that *A. humahuaca* possesses a palmar crest and has a very bluntly ridged rostrum, characters definitely differentiating the two. Geographically in the Province of Jujuy these species are found scarcely more than 70 miles apart, but environmentally, or at least climatologically, they are far removed one from the other. At Humahuaca the annual rainfall totals only 6.11 inches[18]; five months, May to September, are without any precipitation whatsoever, while January, the wettest month, has a rainfall of but 3.27 inches. At Juiuy, on the other hand, the total is 29.26 inches; no month is wholly without some precipitation, although this may fall as low as 0.12 inches in August; the wettest month, January, marks a high of 6.65 inches, more in one month than Humahuaca receives in a year.

Distribution.—Other than the holotype and three paratypes from Humahuaca, Province of Jujuy, Argentina, I have seen but one other specimen, a female of 22.0 mm. in length of carapace and rostrum taken together. This particular specimen was found in a bottle containing two other specimens specifically different, together with a detached cheliped. One of these specimens was selected as the type of *A. affinis* (M. A. C. N. tag No. 9817), the loose cheliped (M. A. C. N. tag No. 4186) represents the same species; the remaining specimen proved to be a male *Aegla abtao* (28.0 mm. in length of carapace and rostrum). This lot of material certainly contains a mixture or else one or both of the labels may be misattached. In the catalogs of the Museo Argentino Ciencias Naturales entry No. 4186 reads simply

[18] The figures on precipitation given in this paragraph were taken from W. W. Reed's undated, bound, typewritten manuscript, "Distribution of Precipitation over the Earth," lent me by the Library of the United States Weather Bureau, through the kindness of Miss Rose Vickers, librarian.

"Neuquen, Mayo 16, 1898; Sr. Carlos Burmeister"; entry No. 9817 concerns specimens of *Mytilus chorus* Molina from Chile received in exchange from Dr. Carlos S. Reed, "21–V, 1919." There is no telling whence comes this unlabeled specimen of *A. humahuaca.*

AEGLA CONCEPCIONENSIS Schmitt

FIGURE 60; PLATE 28, A

Aeglea concepcionensis SCHMITT, Rev. Chilena Hist. Nat., vol. 44 (1940), p. 26, pl. 5, fig. 1, 1942.

Description.—A fairly large species attaining a length of carapace and rostrum together of at least 33 mm.

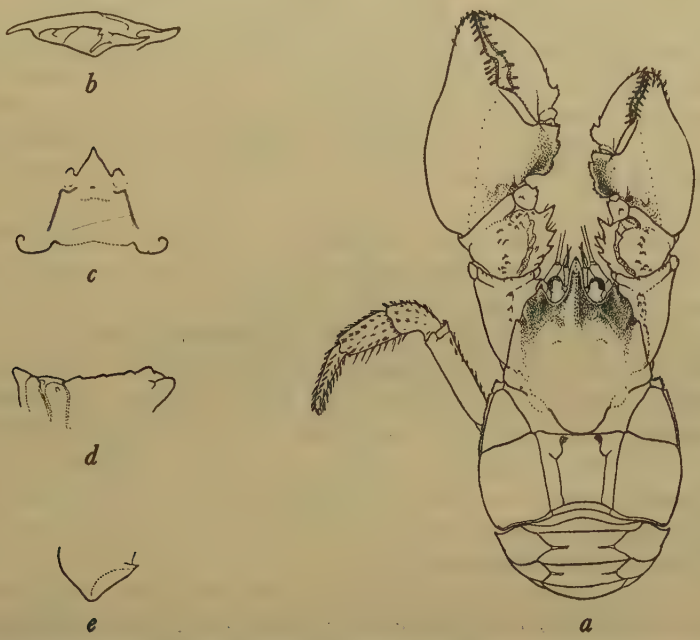

FIGURE 60.—*Aegla concepcionensis,* new species, male holotype: *a,* Dorsal view; *b,* lateral view of anterior portion; *c,* sternum of third and fourth thoracic somites; *d,* inner ventral margin of ischium of left cheliped; *e,* lateral view of second abdominal epimeron. *a, b,* natural size; *c–e,* twice natural size.

Carapace moderately convex. Rostrum somewhat elongate-triangular tongue-shaped, exceeding the eyestalks by not quite twice the length of the cornea, inclined downward, but anteriorly recurved, transversely flattened, excavate either side of median carina. Crest of rostral carina furnished with two rows of tiny corneous scales situated fairly close together behind the level of the posterior margin of the orbit and very closely juxtaposed, or at times even intermingled or imbricated anterior to that level, and in the anterior half

of the free portion of the rostrum apparently becoming a somewhat broken or irregular single line of scales; the more prominently raised portion of the carina extends backward about to the level of the epigastric prominences of the carapace, posterior to these the carina is less prominently marked to between the anterior margins of the protogastric lobes where the carina fades out. Epigastric prominences blunt-nodular, anterior margins of protogastric lobes scarcely or poorly marked, obsolescent and not scaled. Areola short and wide, squat looking.

Orbits of good size, fairly deep, typically without an orbital spine, and usually with scarcely any or only (rarely) a very slight interruption or offset in the outward sweep of the orbital margin at the point where it passes over into the inner margin or slope of the anterolateral spine of the carapace; in the very largest specimens, such as the type, there is more of an offset than in any other specimens of the species that I have seen; there may be one or a few tiny spinules along the outermost portion of the orbital margin, but in no sense is any of them of sufficient consequence to be considered as representing an orbital spine.

Anterolateral spine of good size, anterior extremity reaching nearly or about to the level of the middle of the cornea; the dorsal surface of the anterolateral lobes is much flattened, almost or slightly excavate, giving the impression that the anterolateral spines are inclined upward to a greater extent than in any other species of *Aegla*. Anterolateral angle of first hepatic lobe slightly scabrous and more or less rounded off; just within and below the angle of the right first hepatic lobe of the type is a low projection or tubercle, which is occasionally present in other specimens on one or the other side or sometimes on both sides; second and third hepatic lobes slightly indicated, in some specimens scarcely so.

The larger hand is of good size, moderately inflated or swollen; on the upper surface of either palm there is a faint, obsolescent, yet plainly discernible, low, obliquely longitudinal, narrow swelling running from near the outer posterolateral angle of the palm to the posterior margin of the sinus between the fingers; this ridge is scabrous like the rest of the hand, and is more evident in the smaller specimens than in the very largest ones. On the outer margin of the movable finger of either hand, near its posterior end, there is a well-defined lobe or projection, anteriorly angled and carrying there a small spine or spinule; lobe otherwise scabrous, or very small-spinulose. What there is of a palmar crest (on inner margin of palm) is broadly and shallowly serrate, fairly thin-edged and furnished with a scattering of small spinules; the crest runs back from below the movable

finger to form a higher crest at the posterior end than at the anterior end; posteriorly the crest is somewhat troughed or excavate with slightly upturned margin which stands well away, almost at a right angle, from the inner margin of the palm proper just in advance of the articulation with the carpus.

Carpus of either cheliped carries two longitudinal ridges, the first is the usual somewhat nodulated ridge with more or less transverse short rows of small corneous scales, situated above the spines arming the inner margin of the carpus; the second, scarcely to be called a ridge, is on the middorsal surface of the carpus. It consists of an irregular, scattered row of slight elevations anteriorly scabrous. Anterointernal angle of carpus of cheliped fairly blunt, scarcely subacute, sparsely small-spinulated. Dorsal longitudinal margin of merus armed with a row of corneous tipped or blunted, somewhat conical tubercles which become more conically spinelike as they approach the distal margin of the joint; the anterior margin of the merus at its middorsal point shows but a very faint indication of what might have been an obsolecent swelling with one (on right merus) or two (on left) small corneous denticles; in smaller specimens there is more of an evident lobe or small nodular swelling at this point with finely denticulate anterior margin; outward from this lobe the anterior margin of the merus is in part more or less denticulated. Inner margin of ventral surface of ischium with four, five, or six low swellings or nodulations, of which the anteriormost is usually the largest, and in occasional specimens somewhat blunt tuberculiform; in some others this ischial margin appears no more than a little wavy behind the anterior nodule or tubercle; only rarely does this seem to be tipped with a tiny corneous scale.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite produced to form an acute corneous spinule-tipped angle.

Holotype.—A large male measuring 33 mm. in length to carapace and rostrum, U.S.N.M. No. 79078.

In all, I have examined about 30 specimens of this species. Several are of good size; the majority, however, are of medium or small size. All of them I collected January 13 and 14, 1927, near Concepcion, Chile, in company with Dr. Carlos Oliver Schneider and Carl Junge.

Remarks.—*A. concepcionensis* keys out near *A. laevis;* in the "Remarks" under the latter (p. 507) the two are compared.

In its lack of an orbital spine, *A. concepcionensis* stands near *A. papudo*, in which such a spine is often not properly or truly developed, and *A. affinis*, in which it is lacking (in the unique holo-

type). Of these three species, only *A. concepcionensis* has the anterior epimeral angle definitely acutely produced and spined; in *A. affinis* it is rounded off and unarmed; in *A. papudo* likewise rounded off and generally unarmed, though the angle may carry a tiny adventitious corneous scale, spinule, or "cornule." The hands of *A. papudo* and *A. concepcionensis* are more or less ovoid and swollen or inflated, more so in the former than in the latter, while in *A. affinis* they are more or less subrectangular, and less swollen, though rougher, more scabrous, than in either of the others. *A. papudo* has the most convex carapace, *A. affinis* the least, the convexity of the carapace of *A. concepcionensis* being intermediate. Further, the several suture lines which meet to form the anterolateral angles of the cardiac area of the carapace run together to form a short, transverse or obliquely transverse bar in *A. concepcionensis*, and a more or less longitudinally oriented bar in *A. papudo* and *A. affinis*.

Distribution.—In addition to the type material, I have seen three, not altogether typical males, between 15.5 and 24.5 mm. in length of carapace and rostrum together, from Corral, Chile, collected by Dr. Thomas Barbour (M.C.Z. No. 10481), and two males of 25.5 and 26.5 mm. respectively, collected by Dr. A. Santa-Cruz in the vicinity of Concepcion, Chile, and presented to the United States National Museum by our good friend Dr. Carlos E. Porter, of Santiago.

AEGLA LAEVIS (Latreille)

FIGURE 61; PLATE 28, D

Galathea laevis LATREILLE, Tableau encyclopédique et méthodique . . ., pt. 24, pl. 308, fig. 2, 1818.

Aegla laevis LEACH, Dictionnaire des sciences naturelles, vol. 18, p. 49, 1821.

Aeglea laevis DESMAREST,[19] Considérations générales sur la classe des Crustacés, p. 178, pl. 33, fig. 2, 1825.

Aegla laevis RATHBUN, Proc. U. S. Nat. Mus., vol. 38, p. 602, 1910 (neither synonymy, except first two entries, nor distribution, except Chile, applies).

Description.—A species of small to moderate size, the largest specimen seen measuring 24.5 mm. in length of carapace and rostrum taken together.

Carapace moderately or a little better than moderately convex. Rostrum more or less lingulate (more tongue-shaped than sharply triangular), lateral margins more or less subparallel in the midsection of the free portion, exceeding eyes by 1½ times to nearly twice

[19] Inasmuch as nearly all authors since Desmarest (with the exception of Nicolet, Girard, Fritz Müller, and Moreira) have considered the genus monotypic and so have failed to give specifically recognizable descriptions and illustrations of their material, it is impossible to assign correctly the many specimens that have in the past been determined as *Aegla laevis* to the species to which they properly belong. What I take to be true *Aegla laevis* was never well enough characterized to distinguish it from the now known Chilean species, or, in fact, from any species of *Aegla* other than Nicolet's *A. denticulata*.

the length of the cornea; in lateral view the rostrum inclines downward, although the distal extremity is again lightly but definitely recurved; rostral carina very blunt, often somewhat lumpy and sometimes a bit twisted looking, with an irregular row or two of, at most, microscopically cornified punctae; otherwise, the carina is in general quite smooth appearing; distally the carina tends to fade out or disappear, inasmuch as it becomes indistinguishably merged with the thickened distal, recurved portion of the rostrum which may take in as much as or sometimes even slightly more than the distal third of the free portion of the rostrum; either side of the carina, the dorsal surface of the rostrum is lightly troughed or excavate; at about the

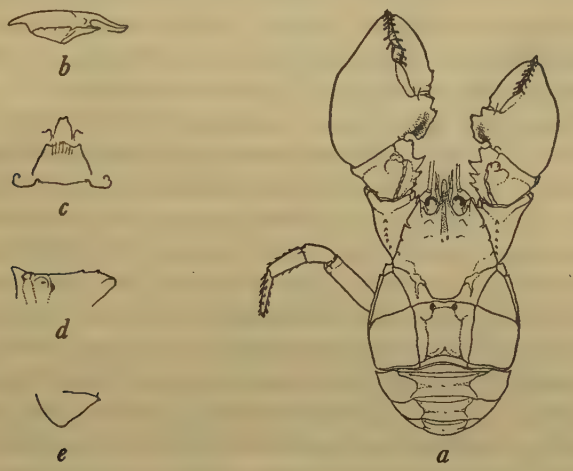

FIGURE 61.—*Aegla laevis* (Latreille), male neotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

level of the posterior margin of the orbits the rostral carina attains its greatest elevation, posteriorly it merges in the general surface of the carapace before reaching the level of the anterior margins of the protogastric lobes. The rostrum of this species is more or less amorphous-looking, much as if in the course of the formative processes it had congealed or become hardened before taking on a truly definitive form.

Protogastric lobes but poorly indicated; except for the gastric region, anterior portion of the carapace is very coarsely and closely punctate, the gastric region is smooth appearing, the punctae being small and relatively widely separated and in part obsolescent; anteriorly the line of demarcation between the two types of punctae defines the anterior margins of the protogastric lobes, at which level the cara-

pace also begins to slope down toward the orbits; epigastric prominences coarsely punctate, not very conspicuous, low swellings.

Extraorbital sinus very small, at times obsolescent and represented by no more than a definite, usually abrupt, often nearly right-angled offset between the outer end of the orbital margin and the inner slope or margin of the anterolateral spine; an orbital spine, or rather spinule, generally present, usually much reduced in size.

Anterolateral spines relatively small, moderately slender, reaching at least to middle of cornea and often beyond. Anterolateral angle of first hepatic lobe fairly well marked, little produced, subacute appearing, though scabrous, and tipped with a corneous scale or two of about the size of, or very slightly larger than, the scattering of similar scales on the lateral margin of this lobe; second and third lobes set off from the preceding and each other by a short, though plainly marked and nearly closed, notch or incision.

Larger hand relatively of good size, moderately thick and swollen, finely scabrous, though appearing smooth and evenly rounded. Movable finger with a small but evident, anteriorly spined lobe on outer margin near base; outer margin of palmar crest more or less subparallel to upper margin of palm proper, cut into three or four scabrous-margined shallow serrations; with rare exceptions the anterior end of upper margin of palmar crest ends abruptly a little distance behind dorsal anterior margin of palm posterior to the base of the movable finger, so that a more or less sharply right angled notch is formed between anterior end of palmar crest and anterior dorsal margin of palm (a somewhat similar, though less noticeably and less well developed notch occurs in the subspecies of *A. laevis* described below, in *A. neuquensis*, perhaps also in *A. affinis*, in *A. riolimayana*, and to some degree in *A. abtao* though in most if not all other species of *Aegla* any comparable notch is scarcely to be distinguished from the toothing or serration of the palmar crest itself). The palmar crest of *A. laevis* is fairly thin, and slightly excavate or troughed adjacent to the margin of the palm proper.

Ridge of carpus of cheliped above spined, inner margin more or less obsolescently nodulated (on the carpus of the minor cheliped of one male the anterior "nodulations" have taken on a distinctly tubercular form; ordinarily the nodulations on this ridge are low and little scabrous); anterior internal lobe or angle of carpus obtusely triangular, apically carrying two or three stout, pointed, conical, corneous scales; spines of inner margin stout, conical, and acutely corneous tipped. Upper longitudinal margin of merus furnished with series of apically scabrous, raised tuberculiform elevations, of which the anteriormost is the largest; middorsal point of anterior margin of merus without node or swelling and otherwise unarmed or unorna-

mented. Inner margin of ventral surface of ischium may have as many as three or four low swellings, the anteriormost of which is the larger and somewhat conical tuberculiform with tiny corneous tip; sometimes second and third swellings, though considerably smaller, are similarly developed; in the neotype only the ultimate and penultimate of these swellings are developed; though small, each is corneous tipped; the ischia of most specimens seem to be armed as in the neotype.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite acutely produced and corneous tipped; anterior margin below acute anterior dorsal angle straight, or at most only slightly concave.

Neotype.—A male of 24 mm. in length of carapace and rostrum taken together, one of a lot of 14 males and 17 females (12 ovig.) contained in the collections of the Museum of Comparative Zoology (M. C. Z. No. 10478) collected "dans une rivière près de St. Iago-de-Chile," collector and date unknown.

Remarks.—This species in some respects seems to be very much like *A. concepcionensis*, though, so far as I am aware, never attaining so large a size, but throughout its several characters lack the definiteness and distinctness of that species. *A. concepcionensis*, except in very rare and obviously not typical instances, lacks anything remotely resembling the usually abrupt offset between the orbit proper and the anterolateral spine of *A. laevis;* moreover, the anterolateral spine of its carapace is stouter and more flattened triangular and the anterolateral lobe is more of an alate expansion in comparison to the more slender, more conically circular (in cross section) spine and more triangular anterolateral lobe of the carapace of *A. laevis.* The second and third hepatic lobes of *A. laevis* are the better marked. Its rostrum is the more truly lingulate of the two, and is more bluntly carinated. The rostrum of *A. concepcionensis* is the nearer an elongate isosceles triangle in shape. The palmar crest of *A. concepcionensis* has nothing like the right-angled notch intervening between the anterior end of the crest and the anterior margin of the palm in advance of the crest as in *A. laevis;* moreover, the palmar crest of *A. concepcionensis* is not at all longitudinally troughed or excavate in any manner suggestive of that state of affairs in *A. laevis.*

A. laevis talcahuano, which follows, differs from both *A. laevis* and *A. concepcionensis* in that the movable finger is wholly without a trace of a lobe, spined or not, on its outer margin near the base.

Distribution.—Besides the lot of material from which the neotype has been selected, I have seen two small ovigerous specimens (19 and 21 mm. long) from the Rio Maipo (M. C. Z. No. 1417) collected by

Lieutenant Gilliss, of the United States Naval Astronomical Expedition of 1849–52, and determined by William Stimpson; three small males (15 to 21 mm. long) and one female (17.5 mm.) from near Melipilla, Province of Sanitago, Chile, which were collected for me by Dr. Carlos E. Porter; and two lots of two ovigerous females each, both belonging to the Museo Argentino and carrying the same catalog number (M. A. C. N. No. 4673) but with no indication other than that they were collected by F. Silvestri in Chile.

Since the foregoing was first written I have seen three additional specimens of *A. laevis*. The most interesting of these is one of Dana's original specimens, already referred to (pp. 433, 436). Beyond the remarks there it is to be noted that the right-angled notch formed between the anterior end of the palmar crest and the anterior dorsal margin of the palm is no better developed than in the subspecies *talcahuano* below, and that the armature of the ventral inner margin of the ischium of the right cheliped closely approximates that of the figured neotype. The specimen in question is 21 mm. in length, carapace and rostrum taken together, and carries Acad. Nat. Sci. Phila. no. 486.

The other two (Acad. Nat. Sci. Phila. no. 1243) are both females, 18 and 22 mm. in length of carapace and rostrum, respectively. In the smaller specimen a small extraorbital sinus and a tiny orbital spinule are present on the right side; on the left side the offset usually found on the inner margin of the anterolateral spine in the absence of an orbital spine or spinule is wanting. The larger specimen has no orbital spinule on either side, but there is instead an appreciable offset to the inner slope or margin of each of the anterolateral spines, a more abrupt offset on the left than on the right side. The hepatic lobes are rather well marked for *A. laevis;* the anterior dorsal epimeral angles in both specimens are furnished with a small corneous spinule or sharp scale. In the larger specimen only, the sternal plate between the chelipeds carries a low, acute, conical, corneous scale, probably adventitious.

AEGLA LAEVIS TALCAHUANO, new subspecies

FIGURE 62; PLATE 28, B, C

Description.—Very near *A. laevis* in all particulars except that the movable finger is wholly without trace of a lobe, whether spined or not, on its outer margin near the base; the palmar crest, though low and very remotely suggestive of the subdisciform crest of *odebrechtii* and its subspecies, is much narrower than in either of those forms; margin of the crest, as compared to *A. laevis*, is scarcely to be described as obsolescently serrate; the notch corresponding to the sharply defined, approximately right-angled one at the anterior end of the palmar crest of *A. laevis* is only obscurely and shallowly

present as a slight emargination at the anterior end of the crest in the type of our subspecies and to an even less degree in the largest of the *Hassler* specimens without locality data; in the latter the crest, though somewhat scabrous, is virtually entire-margined.

Holotype and material examined.—Of this subspecies I have but two reasonably well developed specimens. The first to come to my attention was included in a small lot of *A. papudo* taken by the *Hassler* at Talcahuano, Chile (M. C. Z. No. 10480). This specimen has been made the type of the subspecies; it measures 23.0 mm. in

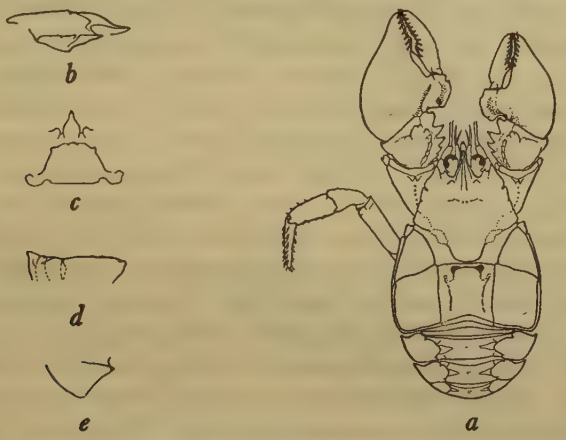

FIGURE 62.—*Aegla laevis talcahuano*, new subspecies, male holotype: *a*, Dorsal view (the rostrum is actually slightly distorted, compare pl. 28, B; it has been symmetrically rendered here by the artist); *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

length of carapace and rostrum taken together. The second specimen (a shade more than 23.0 mm. long) is the largest of three males also secured by the *Hassler* Expedition (M. C. Z. No. 10483). It lacks locality data; the second and third specimens of this lot are respectively 17 and 14 mm. long.

Remarks.—It is with some hesitation that I have here proposed this subspecies of *Aegla laevis*, for, in the light of my studies on the several forms of *Aegla* occurring east of the Andes, those from their western slopes do not seem to be either as well marked or as sharply defined, except of course *A. denticulata* and *A. papudo*. More and better material from Chile, especially from the vicinity of Santiago, Talcahuano, and Corral, is much needed to properly evaluate *A. laevis* and the forms that stand nearest to it.

Distribution.—Known only from the type locality, Talcahuano, Chile, and the one small lot of *Hassler* specimens without locality data.

AEGLA ABTAO Schmitt

FIGURE 63; PLATE 28, F, G

Aeglea abtao SCHMITT, Rev. Chilena Nat., vol. 44 (1940), p. 30, pl. 5, fig. 2, 1942.

Description.—A species of moderate size, attaining a length of carapace and rostrum together of at least 26 mm.

Carapace moderately convex. Rostrum elongate-triangular, but not particularly long, exceeding eyestalks by less than the length of the cornea, sometimes by no more than half the length of the cornea, fairly straight, not anteriorly reflexed, sharply triangular, transversely flattened and only moderately troughed or excavate either side of the median carina. Crest of rostral carina almost fades out near the distal end of the rostrum, which is scaled much as in *A. concepcionensis;* the carina behind the level of the posterior margins of the orbits furnished with two rows of corneous scales set fairly close together; a little anterior to the orbital margin the two rows become somewhat intermingled and even imbricated, so much so in part that in the anterior half of the free portion they form what may be described as an irregular single row of scales; in distal third of free portion this row, like the carina itself, tends to fade out, only suggested by a few scattered scales; raised portion of carina becomes broader and blunter posteriorly, extending backward about to the anterior margin of the protogastric lobes. Epigastric prominences low and blunt; anterior margins of protogastric lobes not particularly set off from the rest of the carapace, but nevertheless well marked by a row of thick, closely set corneous scales much larger than the tiny scales seated in most of the punctae of the anterior portion of the carapace. Areola moderately broad.

Orbits fairly shallow, orbital sinus set off from the distinct and well formed though small extraorbital sinus by a not large but well-developed orbital spine.

Anterior extremity of relatively small anterolateral spine scarcely falling short of, or scarcely reaching, the posterior margin of the cornea; anterolateral lobes of carapace not particularly flattened; the anterolateral spines of this species are among the most reduced in size of any species of *Aegla.* First hepatic lobe like rest of lateral margin of anterior portion of carapace minutely spinulated, a slightly larger corneous spinule tips the subacute anterolateral angle of this lobe; second and third lobes indicated by slight notchings of the lateral margin.

Larger hand of good size, swollen, no low ridge as in *A. concepcionensis* apparent. There is an evident, though reduced lobe on the outer margin of the movable finger near its base; anteriorly the lobe is small spined. Palmar crest well formed but not high, sharply

serrate, serrations spinulated, small spine-tipped; in thickness crest tapers more or less evenly from base to margin, dorsal surface not impressed or excavate. No evident ridging on dorsal surface of carpus other than the usual transversely scabrous, somewhat nodulated ridge above the spined inner margin of the joint. Anterointernal angle or lobe of carpus armed with an acute, corneous spine of good size, almost invariably accompanied by a smaller spine lying immediately against the posterior border of the larger spine; one or two additional still smaller spines or spinules may be inserted on the posterior margin of the carpal lobe. Dorsal longitudinal margin

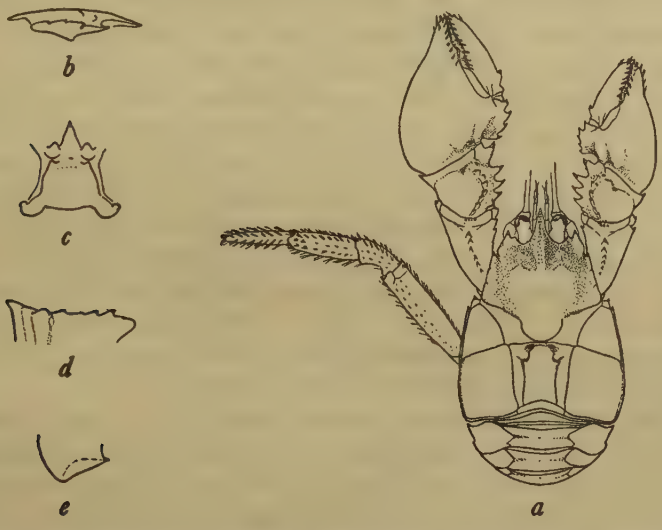

FIGURE 63.—*Aegla abtao*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c–e*, twice natural size.

of merus of cheliped armed with a row of conical tubercles tipped with several or a few closely juxtaposed pointed corneous scales; at middle of anterior margin of merus there is a low but evident anteriorly convex and fine denticulate swelling. Inner margin of ventral surface of ischium with a prominent, stout, conical, acutely corneous tipped spine at anterior end, a very much lower (squat) and perhaps a little broader one, also with acute corneous tip, at posterior end; at anterior third of margin there is a similar about subequal swelling of the same sort as the posterior one, and between these two sometimes a very slight or merely suggested swelling or nodulation.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite somewhat produced and armed with

an acute, flattened, corneous spine; anterior margin below spine about straight; ventral angle rounded off.

Holotype.—The largest of seven specimens (5 males and 2 females), a male measuring 26.6 mm. in median length of carapace and rostrum together, U.S.N.M. No. 79079. The smallest specimen is also a male and measures about 11 mm. in median length of carapace and rostrum. The specimens were collected by Dr. C. H. Eigenmann at Abtao, Chile, February 22, 1919.

Remarks.—See under *A. riolimayana*, "Remarks," p. 515.

Distribution.—With certainty at present known only from the type locality, Abtao, Chile. An unmistakable representative of the species, an untagged male of 28.0 mm. in length of carapace and rostrum, was found along with several other specimens in a bottle of material borrowed from the Buenos Aires Museum. One was the type of *A. affinis* (M.A.C.N. No. 9817), another an unattached cheliped of the same species (tagged M.A.C.N. No. 4186), and an untagged female of *A. humahuaca* (22.0 mm. long). In the catalogs of the Museo Argentino Ciencias Naturales entry No. 4186 reads simply, "Neuquen, Mayo 16, 1898; Sr. Carlos Burmeister"; entry No. 9187 concerns specimens of *Mytilus chorus* Molina received in exchange from Dr. Carlos S. Reed, 21–V, 1919. The bottle contains a mixture of things, or else a misattached label or labels, and to the untagged specimens no locality at all may be safely attached.

Further, I have before me a small male of 19.5 mm. in length of carapace and rostrum together, also collected by Dr. Eigenmann in Chile, "Falls of Petrohue," March 8, 1919. Although this particular specimen has been only tentatively placed with *A. abtao*, it is probably correctly determined; the rostrum seems a bit more slender than typical *A. abtao*, the areola perhaps a bit narrower and the ventral inner margin of the ischium somewhat smoother.

Almost too late for mention, I received a very fine, dried example of this species from Dr. Carlos A. Porter. It measures 26 mm. in length of carapace and rostrum and was collected by Dr. Porter himself, in December 1941, near "El Valean," Santiago, Chile. The rostrum fits the description of the type almost exactly; indeed this specimen is a very close counterpart of the type. The lobular tooth on the fixed finger of the minor right cheliped is no more in evidence than in the type (fig. 63, *a*). However, the conical tubercles on the dorsal longitudinal margin of the merus of the cheliped appear single-spined or spinule-tipped; the inner ventral margin of the ischium is as in the type on the right cheliped; on the left one there are two small elevations of which the anterior is the larger and small spinule-tipped between the anterior and posterior spines. The anterior dorsal angle of the epimeron of the second abdominal somite is armed with two small spines or spinules on the left side, with one only on the right.

AEGLA RIOLIMAYANA, new species

FIGURE 64; PLATE 28, E

Description.—A species of perhaps moderate size, the largest specimen so far seen does not exceed 24.0 mm. in length of carapace and rostrum together. Stands near the preceding species, *A. abtao*.

Like *A. abtao*, our species has the carapace moderately convex; the rostrum, though basally broad and flattened, distally is narrowly and sharply triangular, almost stilletolike, straight, and more or less sharply carinated to the tip (*A. riolimayana* has the most sharply acuminate and distally narrowed rostrum of all species included in the A^2 section of our diagnostic key); the tip of the rostrum extends beyond the eyestalks by about one-half the length of the cornea; the rostral carina is armed with a somewhat wavering, virtually single line of small tiny corneous scales, which get a little larger anteriorly; toward the tip these scales sometimes, for a very brief interval, may form an irregular double row; the dorsal surface of the rostrum is noticeably depressed or excavate either side between the rostral carina and the seemingly elevated lateral margins of the rostrum; the rostral carina runs back about to the level of the anterior margins of the protogastric lobes which, like the epigastric prominences, are not particularly well marked.

Orbital sinus relatively wide, orbital spine but a spinule, extraorbital sinus small, at times scarcely more than a notch at the base of the inner slope or margin of the anterolateral spine; the latter small, conical, scarcely reaching the posterior margin of the cornea.

Anterolateral angle of the first hepatic lobe well marked, though no more than scabrous with corneous scales no larger than the others with which the lateral margins of the hepatic lobes are armed; second and third hepatic lobes scarcely more than sinuosities in the lateral margin of the forepart of the carapace.

Hand of moderate size, moderately inflated; lobular tooth on fixed finger relatively small but plainly marked; a definite, though small, spined lobe on outer margin of movable finger near base. Palmar crest resembling that of *A. laevis*, outer margin of crest more or less subparallel to upper margin of palm proper, and cut into three or four scabrous-margined shallow serrations, anterior angles or apices of serrations, however, armed with a sharp-pointed scale or spinule; as in *A. laevis* there is a more or less definitely right-angled notch between anterior end of the palmar crest and the anterior dorsal margin of palm.

Ridge of carpus of cheliped above spined inner margin not prominent, low and obsolescently nodulated; armed on these low swellings with a few small corneous denticles or scales; spined inner margin armed with slender, conical, clean-cut spines, of which the anterior-

most is longest and most slender; anterior internal lobes of carpus armed with a single, well-developed, smooth, clean-cut, spine; all carpal spines with acute corneous tips. Upper longitudinal margin of merus with a series of sharp corneous spines, of which the anteriormost is the larger and elevated on a small conical tubercle above the level of the rest; anterior margin of merus in front of this anterior spine has a very slightly marked, minutely denticulate lobe; a few other tiny denticles may also occur along the anterior margin of the merus. Inner margin of ventral surface of ischium with low, broadly conical, corneous scale-tipped tubercle at anterior end and a relatively insignificant, low, nodular swelling at posterior end, margin of ischium between these two low elevations virtually straight, at most only very slightly sinuous.

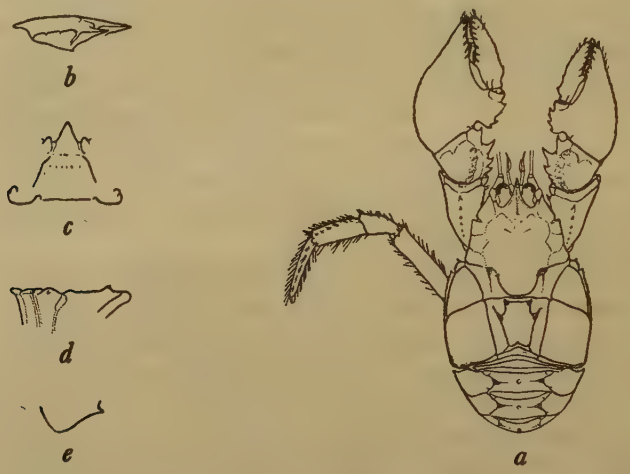

FIGURE 64.—*Aegla riolimayana*, new species, male holotype: *a*, Dorsal view; *b*, lateral view of anterior portion; *c*, sternum of third and fourth thoracic somites; *d*, inner ventral margin of ischium of left cheliped; *e*, lateral view of second abdominal epimeron. *a*, *b*, natural size; *c*–*e*, twice natural size.

Anterior dorsal angle of epimeron of second (in lateral view, apparent first) abdominal somite produced to form an acute corneous tipped spine; anterior margin below this spine more or less straight.

Holotype.—The largest of five males taken by John W. Titcomb, November 19, 1903, in the Rio Limay, which forms the boundary line between the territories of Rio Negro and Neuquen, Argentina. These specimens were taken not far from the outlet of Lago Nahuel Huapi, where Mr. Titcomb had obtained other specimens of this species a few days before. The holotype, U.S.N.M. No. 80025, measures 23.5 mm. in length of carapace and rostrum together.

Remarks.—This species and *A. abtao* are related. They are very similar in appearance and in common have noticeably short anterolateral spines, relatively shorter than in other Aeglas, yet on close examination there appear constant differences in the general shape of the rostrum, its relative degree of flatness and excavation, and distal attenuation. The anterolateral angle of the first hepatic lobe of *A. abtao* seems always to be acutely armed with a small spinule or sharply pointed scale, larger than those generally arming the lateral margin of the forepart of the carapace; in *riolimayana* this angle is more or less rounded off, at most subacute, and scabrous with scales no different from those generally arming the lateral margins of the hepatic lobes. The anterior internal lobe of the carpus of the chelipeds seems to be differently armed or spined in the two species; there seems to be less nodulation of the inner ventral border of the ischium of the chelipeds in *A. riolimayana* than in *A. abtao.* The posterior more or less straight portion of the lateral grooves or furrows of the areola are subparallel in *A. abtao;* in *A. riolimayana* they exhibit a decided convergence posteriorly; the straight sections of the lateral boundaries of the areola are farther removed from the lateral suture lines of the cardiac area at their posterior than at their anterior ends (fig. 64); in *A. abtao* the reverse is true (fig. 63).

Distribution.—All specimens of this species that I have seen are from the Rio Limay in the vicinity of Lago Nahuel Huapi or from the lake itself, or from their immediate tributaries. In addition to the type lot of five males, Mr. Titcomb obtained some 20 specimens, males and females nearly equally divided, from the outlet of the lake, November 15, 1903. Of these the largest and smallest males are, respectively, 24 and about 9 mm. in length of carapace and rostrum taken together, the largest and smallest females 20.5 and 10.0 mm., respectively; two small males (8.5 and 14 mm.) from Arroyo de Jones, tributary to Lake Nahuel Huapi; and another small male (21 mm.) from "Victoria Island, Nahuel Huapi," November 29, 1903. On November 22, 1926, R. C. Shannon collected one small male (16.0 mm.) at Correntoso, north end of Lago Nahuel Huapi, which he presented to the United States National Museum. Otherwise, I have examined three small specimens belonging to the Museo Argentino, two small females (19.0 and 20.0 mm.) from Lago Nahuel Huapi, which had been purchased from Emilio Budin (M.A.C.N. No. 9679), and one male (20.0 mm., M.A.C.N. No. 8388), which appears to be this species and which carries merely the designation "Neuquen" [Territory?].

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NOTE

Unless otherwise stated, the photographs shown in the plates that follow are of the male holotype, approximately natural size.

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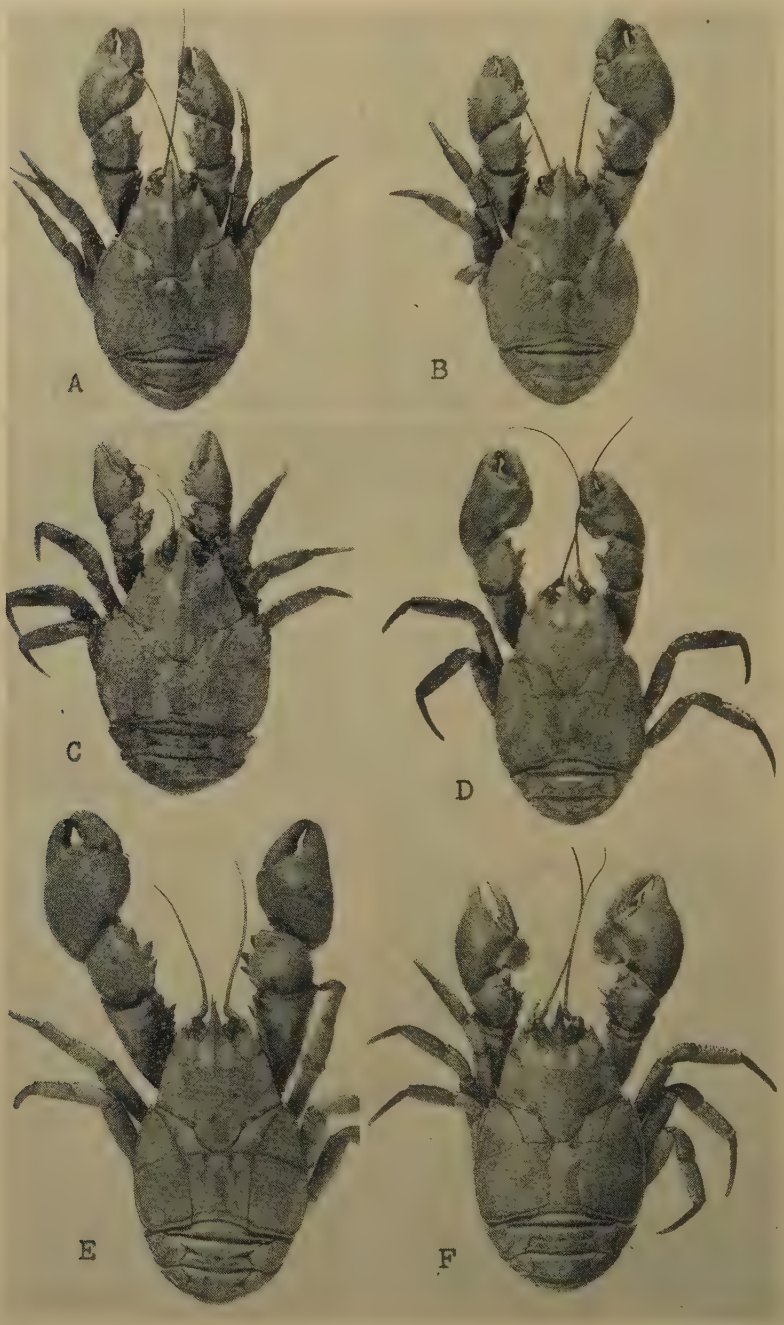
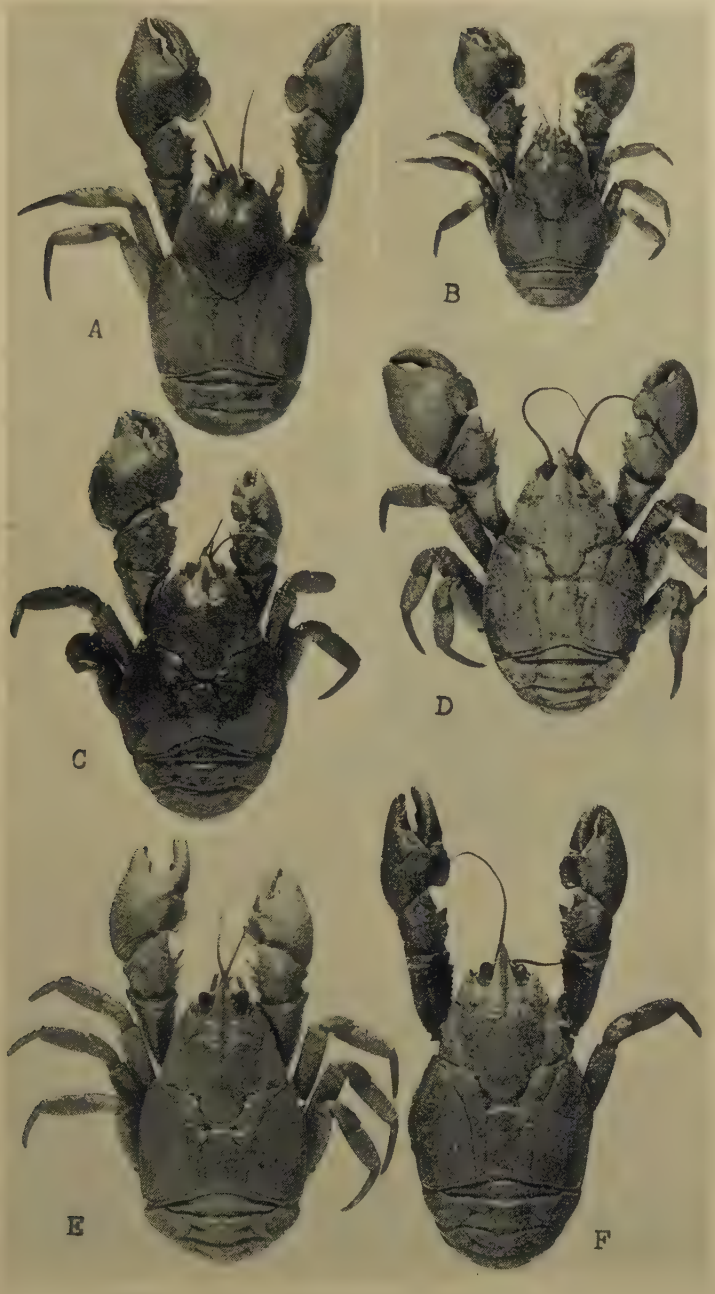
A, *Aegla parana;* B, *A. sanlorenzo;* C, *A. platensis;* D, *A. uruguayana.*



A, *Aegla prado;* B, *A. prado,* male paratype; C, *A. denticulata,* male neotype; D, *A. franco;* E, *A. jujuyana;* F, *A. castro.*



A, *Aegla odebrechtii;* B, *A. o. paulensis;* C, *A. papudo;* D, *A. humahuaca;* E, *A. neuquensis;* F, *A. affinis* (the ambulatory leg shown is the inadvertently reversed left leg of text fig. 58).

A, *Aegla concepcionensis;* B, *A. laevis talcahuano;* C, *A. l. talcahuano,* male paratype; D, *A. laevis,* male neotype; E, *A. riolimayana;* F, *A. abtao;* G, *A. abtao,* male paratype.